real-titanic-predictions

September 16, 2024

[3]:
```
# Import libraries
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
```

[4]:
```
# Reading the dataset
titanic_data = pd.read_csv('/content/drive/MyDrive/Tech Consulting/
 ↪TitanicPreprocessed.csv')
titanic_data.head()
```

[4]:

	Sex	Age	SibSp	Parch	Fare	Title_Master	Title_Miss	Title_Mr	\
0	1	22.0	1	0	7.2500	0	0	1	
1	0	38.0	1	0	71.2833	0	0	0	
2	0	26.0	0	0	7.9250	0	1	0	
3	0	35.0	1	0	53.1000	0	0	0	
4	1	35.0	0	0	8.0500	0	0	1	

	Title_Mrs	Title_Officer	…	Ticket_STONOQ	Ticket_SWPP	Ticket_WC	\
0	0	0	…	0	0	0	
1	1	0	…	0	0	0	
2	0	0	…	0	0	0	
3	1	0	…	0	0	0	
4	0	0	…	0	0	0	

	Ticket_WEP	Ticket_XXX	FamilySize	Singleton	SmallFamily	LargeFamily	\
0	0	0	2	0	1	0	
1	0	0	2	0	1	0	
2	0	0	1	0	0	0	
3	0	1	2	0	1	0	
4	0	1	1	0	0	0	

	Survived
0	0
1	1
2	1
3	1

```
4         0

[5 rows x 69 columns]
```

1 EDA

1.1 Basic Data Overview

[5]:
```
titanic_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 69 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   Sex             891 non-null    int64
 1   Age             891 non-null    float64
 2   SibSp           891 non-null    int64
 3   Parch           891 non-null    int64
 4   Fare            891 non-null    float64
 5   Title_Master    891 non-null    int64
 6   Title_Miss      891 non-null    int64
 7   Title_Mr        891 non-null    int64
 8   Title_Mrs       891 non-null    int64
 9   Title_Officer   891 non-null    int64
 10  Title_Royalty   891 non-null    int64
 11  Embarked_C      891 non-null    int64
 12  Embarked_Q      891 non-null    int64
 13  Embarked_S      891 non-null    int64
 14  Cabin_A         891 non-null    int64
 15  Cabin_B         891 non-null    int64
 16  Cabin_C         891 non-null    int64
 17  Cabin_D         891 non-null    int64
 18  Cabin_E         891 non-null    int64
 19  Cabin_F         891 non-null    int64
 20  Cabin_G         891 non-null    int64
 21  Cabin_T         891 non-null    int64
 22  Cabin_U         891 non-null    int64
 23  IsChild         891 non-null    int64
 24  Pclass_1        891 non-null    int64
 25  Pclass_2        891 non-null    int64
 26  Pclass_3        891 non-null    int64
 27  Ticket_A        891 non-null    int64
 28  Ticket_A4       891 non-null    int64
 29  Ticket_A5       891 non-null    int64
 30  Ticket_AQ3      891 non-null    int64
 31  Ticket_AQ4      891 non-null    int64
```

```
 32  Ticket_AS       891 non-null    int64
 33  Ticket_C        891 non-null    int64
 34  Ticket_CA       891 non-null    int64
 35  Ticket_CASOTON  891 non-null    int64
 36  Ticket_FC       891 non-null    int64
 37  Ticket_FCC      891 non-null    int64
 38  Ticket_Fa       891 non-null    int64
 39  Ticket_LINE     891 non-null    int64
 40  Ticket_LP       891 non-null    int64
 41  Ticket_PC       891 non-null    int64
 42  Ticket_PP       891 non-null    int64
 43  Ticket_PPP      891 non-null    int64
 44  Ticket_SC       891 non-null    int64
 45  Ticket_SCA3     891 non-null    int64
 46  Ticket_SCA4     891 non-null    int64
 47  Ticket_SCAH     891 non-null    int64
 48  Ticket_SCOW     891 non-null    int64
 49  Ticket_SCPARIS  891 non-null    int64
 50  Ticket_SCParis  891 non-null    int64
 51  Ticket_SOC      891 non-null    int64
 52  Ticket_SOP      891 non-null    int64
 53  Ticket_SOPP     891 non-null    int64
 54  Ticket_SOTONO2  891 non-null    int64
 55  Ticket_SOTONOQ  891 non-null    int64
 56  Ticket_SP       891 non-null    int64
 57  Ticket_STONO    891 non-null    int64
 58  Ticket_STONO2   891 non-null    int64
 59  Ticket_STONOQ   891 non-null    int64
 60  Ticket_SWPP     891 non-null    int64
 61  Ticket_WC       891 non-null    int64
 62  Ticket_WEP      891 non-null    int64
 63  Ticket_XXX      891 non-null    int64
 64  FamilySize      891 non-null    int64
 65  Singleton       891 non-null    int64
 66  SmallFamily     891 non-null    int64
 67  LargeFamily     891 non-null    int64
 68  Survived        891 non-null    int64
dtypes: float64(2), int64(67)
memory usage: 480.4 KB
```

[6]:
```
titanic_data.describe()
```

[6]:

	Sex	Age	SibSp	Parch	Fare	\
count	891.000000	891.000000	891.000000	891.000000	891.000000	
mean	0.647587	29.207823	0.523008	0.381594	32.204208	
std	0.477990	13.557871	1.102743	0.806057	49.693429	
min	0.000000	0.420000	0.000000	0.000000	0.000000	

```
25%      0.000000   21.000000    0.000000    0.000000    7.910400
50%      1.000000   26.000000    0.000000    0.000000   14.454200
75%      1.000000   36.750000    1.000000    0.000000   31.000000
max      1.000000   80.000000    8.000000    6.000000  512.329200

       Title_Master  Title_Miss    Title_Mr   Title_Mrs  Title_Officer  …  \
count    891.000000  891.000000  891.000000  891.000000     891.000000  …
mean       0.044893    0.206510    0.580247    0.142536       0.020202  …
std        0.207186    0.405028    0.493796    0.349796       0.140770  …
min        0.000000    0.000000    0.000000    0.000000       0.000000  …
25%        0.000000    0.000000    0.000000    0.000000       0.000000  …
50%        0.000000    0.000000    1.000000    0.000000       0.000000  …
75%        0.000000    0.000000    1.000000    0.000000       0.000000  …
max        1.000000    1.000000    1.000000    1.000000       1.000000  …

       Ticket_STONOQ  Ticket_SWPP   Ticket_WC  Ticket_WEP  Ticket_XXX  \
count          891.0   891.000000  891.000000  891.000000  891.000000
mean             0.0     0.002245    0.011223    0.003367    0.741863
std              0.0     0.047351    0.105403    0.057961    0.437855
min              0.0     0.000000    0.000000    0.000000    0.000000
25%              0.0     0.000000    0.000000    0.000000    0.000000
50%              0.0     0.000000    0.000000    0.000000    1.000000
75%              0.0     0.000000    0.000000    0.000000    1.000000
max              0.0     1.000000    1.000000    1.000000    1.000000

       FamilySize  Singleton  SmallFamily  LargeFamily    Survived
count  891.000000      891.0   891.000000   891.000000  891.000000
mean     1.904602        0.0     0.327722     0.069585    0.383838
std      1.613459        0.0     0.469646     0.254589    0.486592
min      1.000000        0.0     0.000000     0.000000    0.000000
25%      1.000000        0.0     0.000000     0.000000    0.000000
50%      1.000000        0.0     0.000000     0.000000    0.000000
75%      2.000000        0.0     1.000000     0.000000    1.000000
max     11.000000        0.0     1.000000     1.000000    1.000000

[8 rows x 69 columns]
```

[7]:
```python
# Checking for missing values
for column in titanic_data.columns:
    print(f"{column}: {titanic_data[column].isnull().sum()}")
```

```
Sex: 0
Age: 0
SibSp: 0
Parch: 0
Fare: 0
Title_Master: 0
```

```
Title_Miss: 0
Title_Mr: 0
Title_Mrs: 0
Title_Officer: 0
Title_Royalty: 0
Embarked_C: 0
Embarked_Q: 0
Embarked_S: 0
Cabin_A: 0
Cabin_B: 0
Cabin_C: 0
Cabin_D: 0
Cabin_E: 0
Cabin_F: 0
Cabin_G: 0
Cabin_T: 0
Cabin_U: 0
IsChild: 0
Pclass_1: 0
Pclass_2: 0
Pclass_3: 0
Ticket_A: 0
Ticket_A4: 0
Ticket_A5: 0
Ticket_AQ3: 0
Ticket_AQ4: 0
Ticket_AS: 0
Ticket_C: 0
Ticket_CA: 0
Ticket_CASOTON: 0
Ticket_FC: 0
Ticket_FCC: 0
Ticket_Fa: 0
Ticket_LINE: 0
Ticket_LP: 0
Ticket_PC: 0
Ticket_PP: 0
Ticket_PPP: 0
Ticket_SC: 0
Ticket_SCA3: 0
Ticket_SCA4: 0
Ticket_SCAH: 0
Ticket_SCOW: 0
Ticket_SCPARIS: 0
Ticket_SCParis: 0
Ticket_SOC: 0
Ticket_SOP: 0
Ticket_SOPP: 0
```

```
Ticket_SOTONO2: 0
Ticket_SOTONOQ: 0
Ticket_SP: 0
Ticket_STONO: 0
Ticket_STONO2: 0
Ticket_STONOQ: 0
Ticket_SWPP: 0
Ticket_WC: 0
Ticket_WEP: 0
Ticket_XXX: 0
FamilySize: 0
Singleton: 0
SmallFamily: 0
LargeFamily: 0
Survived: 0
```

[8]:
```python
# Checking for data types
for column in titanic_data.columns:
    print(f"{column}: {titanic_data[column].dtypes}")
```

```
Sex: int64
Age: float64
SibSp: int64
Parch: int64
Fare: float64
Title_Master: int64
Title_Miss: int64
Title_Mr: int64
Title_Mrs: int64
Title_Officer: int64
Title_Royalty: int64
Embarked_C: int64
Embarked_Q: int64
Embarked_S: int64
Cabin_A: int64
Cabin_B: int64
Cabin_C: int64
Cabin_D: int64
Cabin_E: int64
Cabin_F: int64
Cabin_G: int64
Cabin_T: int64
Cabin_U: int64
IsChild: int64
Pclass_1: int64
Pclass_2: int64
Pclass_3: int64
Ticket_A: int64
```

```
Ticket_A4: int64
Ticket_A5: int64
Ticket_AQ3: int64
Ticket_AQ4: int64
Ticket_AS: int64
Ticket_C: int64
Ticket_CA: int64
Ticket_CASOTON: int64
Ticket_FC: int64
Ticket_FCC: int64
Ticket_Fa: int64
Ticket_LINE: int64
Ticket_LP: int64
Ticket_PC: int64
Ticket_PP: int64
Ticket_PPP: int64
Ticket_SC: int64
Ticket_SCA3: int64
Ticket_SCA4: int64
Ticket_SCAH: int64
Ticket_SCOW: int64
Ticket_SCPARIS: int64
Ticket_SCParis: int64
Ticket_SOC: int64
Ticket_SOP: int64
Ticket_SOPP: int64
Ticket_SOTONO2: int64
Ticket_SOTONOQ: int64
Ticket_SP: int64
Ticket_STONO: int64
Ticket_STONO2: int64
Ticket_STONOQ: int64
Ticket_SWPP: int64
Ticket_WC: int64
Ticket_WEP: int64
Ticket_XXX: int64
FamilySize: int64
Singleton: int64
SmallFamily: int64
LargeFamily: int64
Survived: int64
```

[9]:
```
# Checking for duplicates
titanic_data.duplicated().sum()
```

[9]: 95

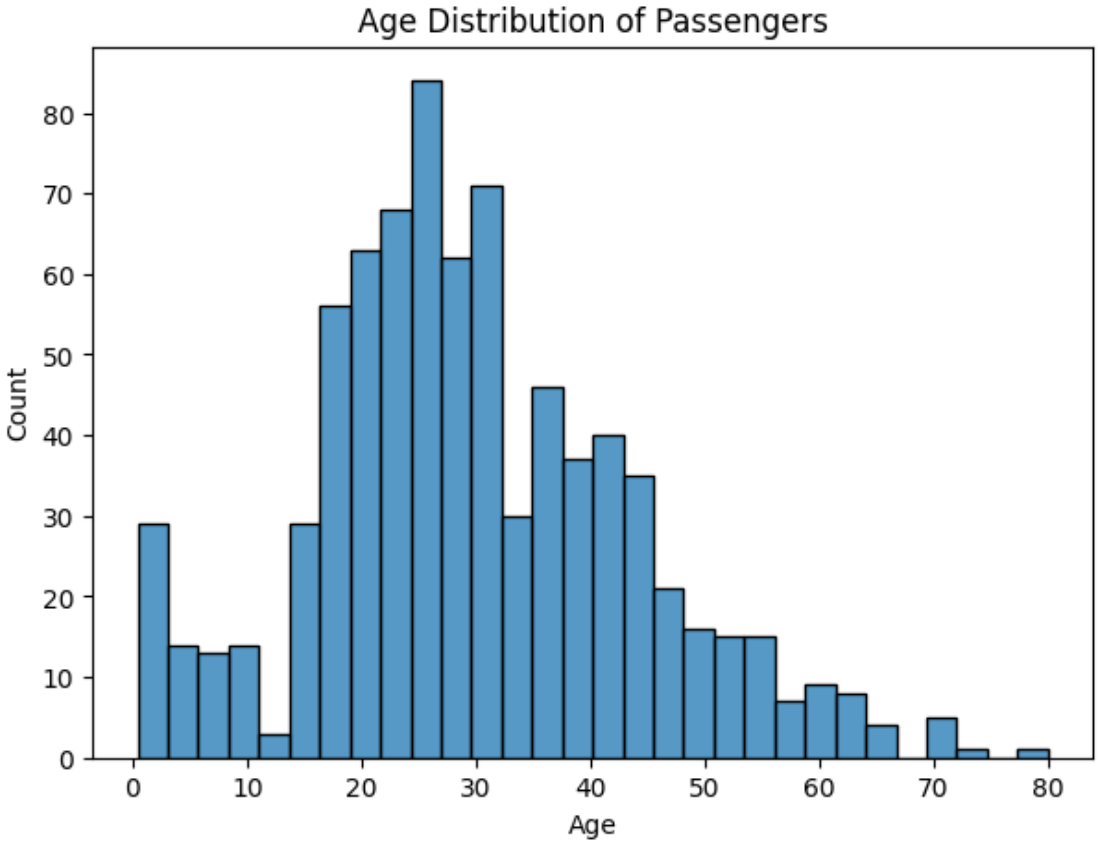
[10]:
```
# Dropping the duplicates
titanic_data.drop_duplicates(inplace=True)
```

[11]:
```
# Checking for duplicates
titanic_data.duplicated().sum()
```

[11]: 0

1.2 Data Distribution

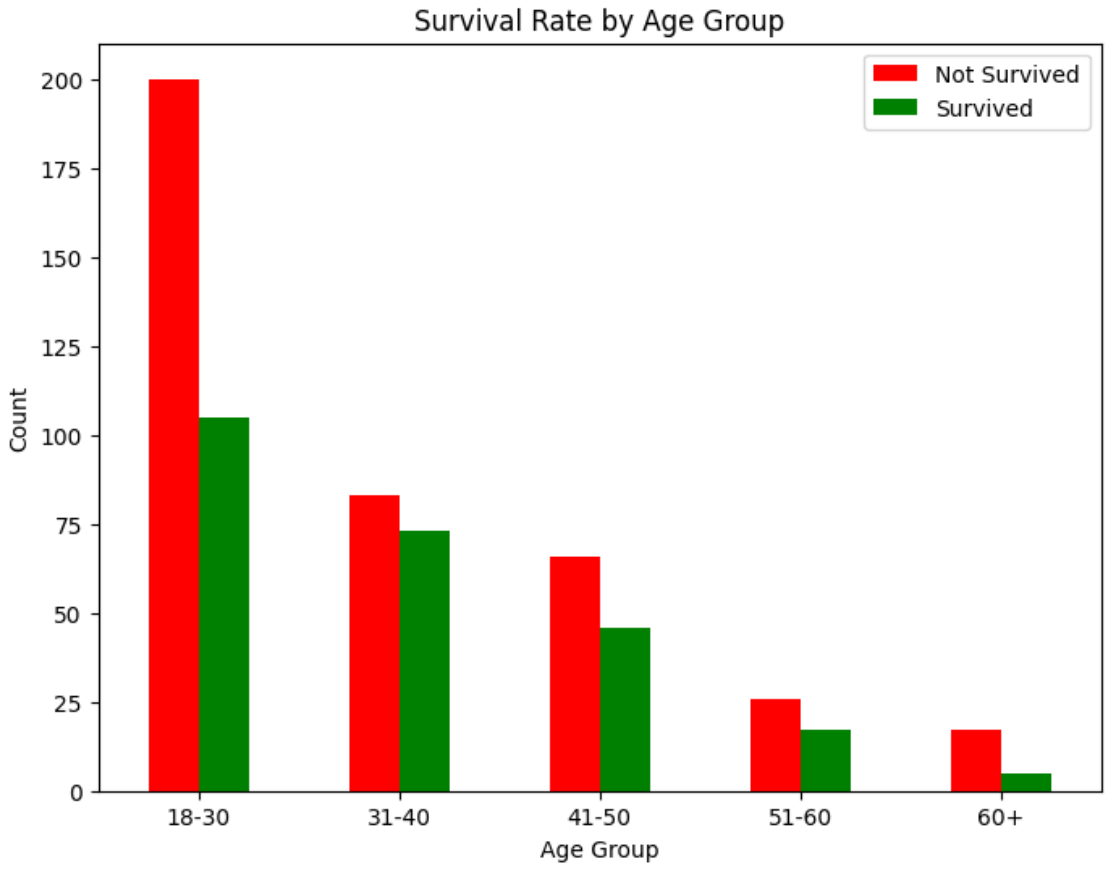
[12]:
```
# Age Distribution
plt.figure(figsize=(7,5))
sns.histplot(titanic_data['Age'], bins=30)
plt.title('Age Distribution of Passengers')
plt.xlabel('Age')
plt.ylabel('Count')
plt.show()
```



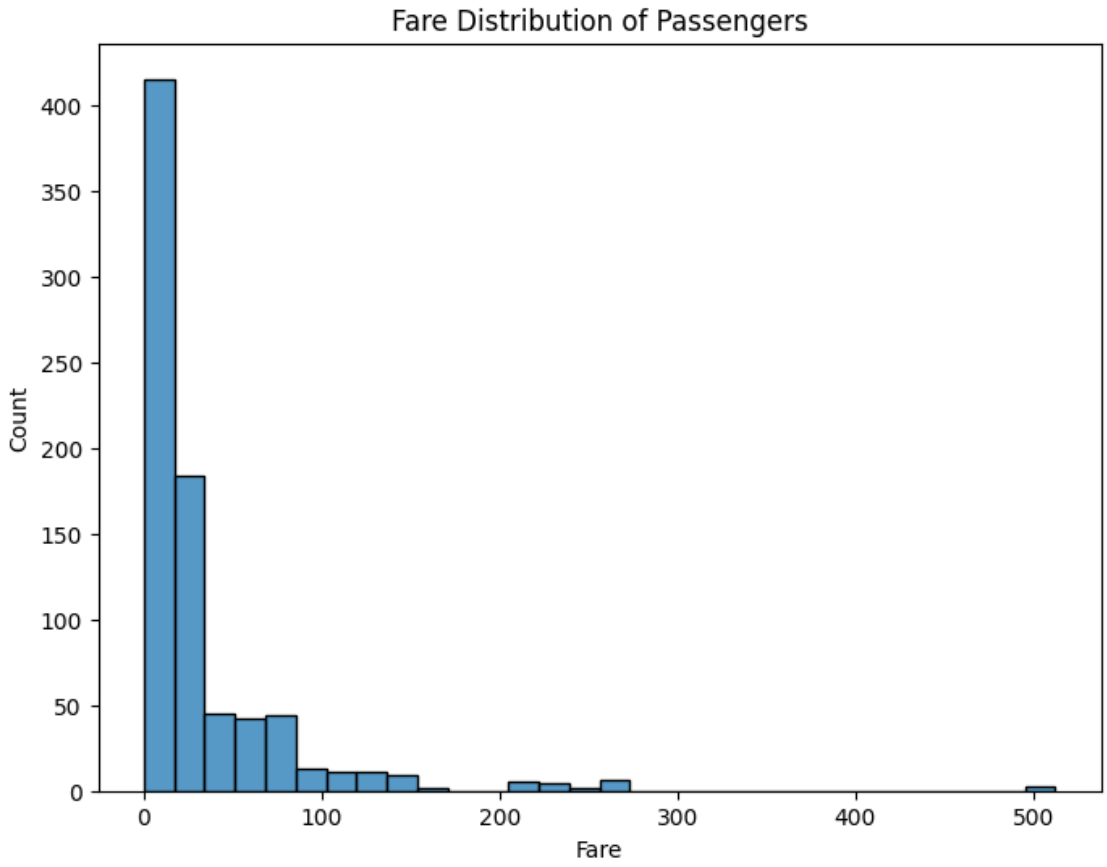
[13]:
```
# Group by Age and Survival Status
age_survived = titanic_data.groupby([pd.cut(titanic_data['Age'], bins=[18, 30,␣
↪40, 50, 60, 100], labels=['18-30', '31-40', '41-50', '51-60', '60+']),␣
↪'Survived']).size().unstack()

# Plotting
plt.figure(figsize=(8,6))
age_survived.plot(kind='bar', stacked=False, color=['red', 'green'],␣
↪figsize=(8,6))  # 'red' for not survived (0) and 'green' for survived (1)
plt.title('Survival Rate by Age Group')
plt.xlabel('Age Group')
plt.ylabel('Count')
plt.xticks(rotation=0)  # Keep x-labels horizontal
plt.legend(['Not Survived', 'Survived'])  # Add legend to indicate colors
plt.show()
```

```
<ipython-input-13-1681d1a3cac9>:2: FutureWarning: The default of observed=False
is deprecated and will be changed to True in a future version of pandas. Pass
observed=False to retain current behavior or observed=True to adopt the future
default and silence this warning.
  age_survived = titanic_data.groupby([pd.cut(titanic_data['Age'], bins=[18, 30,
40, 50, 60, 100], labels=['18-30', '31-40', '41-50', '51-60', '60+']),
'Survived']).size().unstack()
```

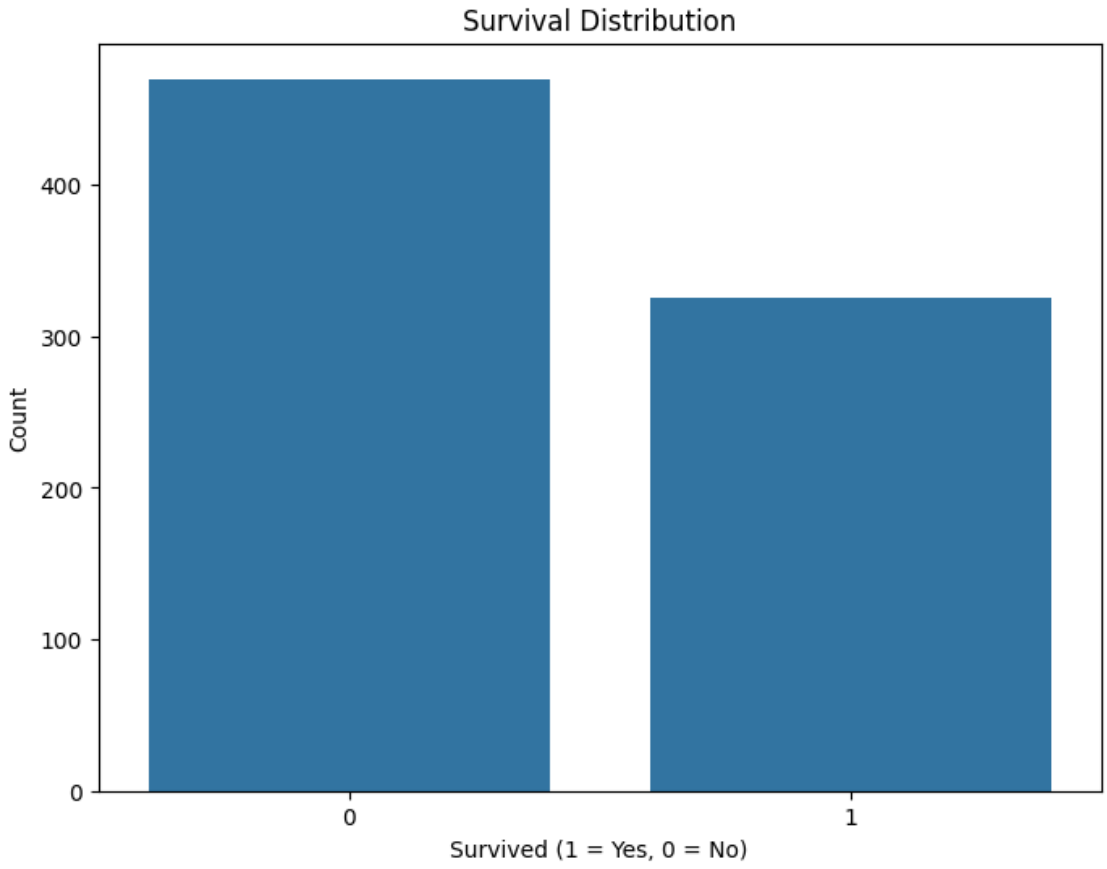
```
<Figure size 800x600 with 0 Axes>
```



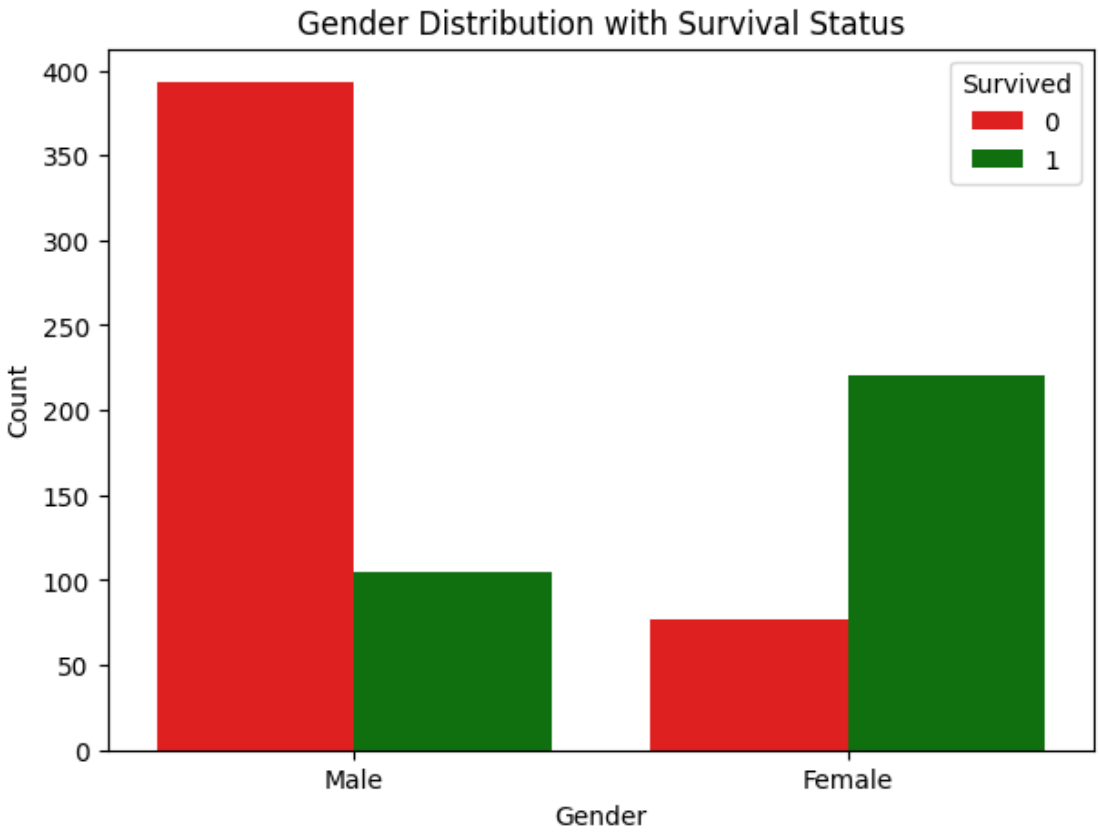
[14]:
```
# Fare Distribution
plt.figure(figsize=(8,6))
sns.histplot(titanic_data['Fare'], bins=30)
plt.title('Fare Distribution of Passengers')
plt.xlabel('Fare')
plt.ylabel('Count')
plt.show()
```



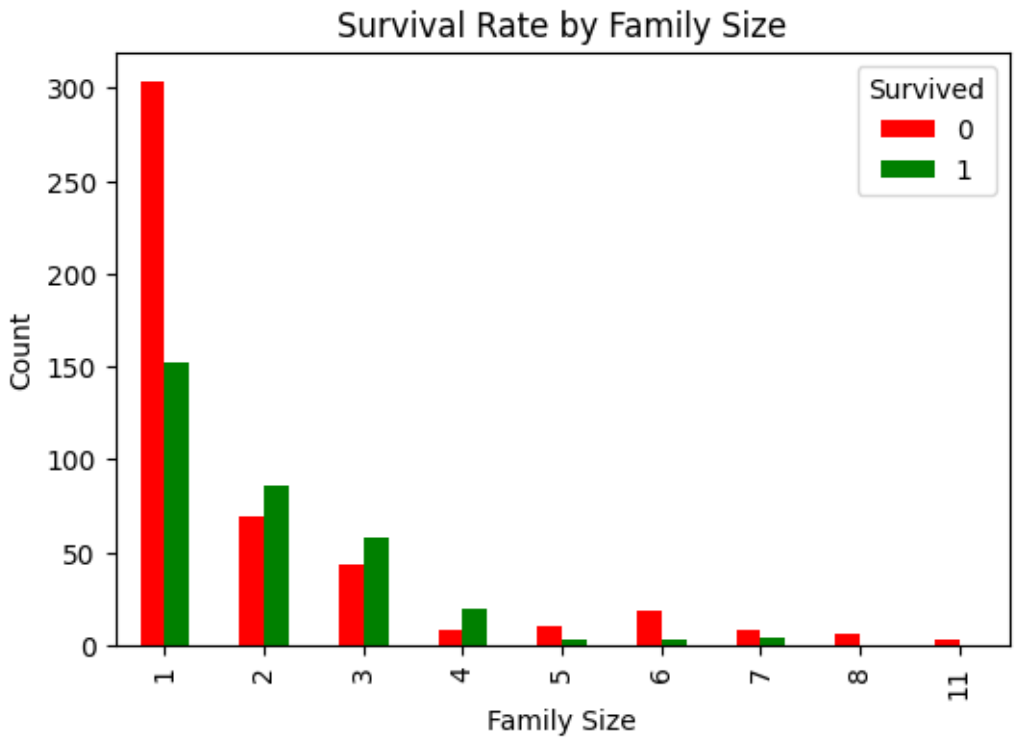
[15]:
```
# Survival Count
plt.figure(figsize=(8,6))
sns.countplot(x='Survived', data=titanic_data)
plt.title('Survival Distribution')
plt.xlabel('Survived (1 = Yes, 0 = No)')
plt.ylabel('Count')
plt.show()
```



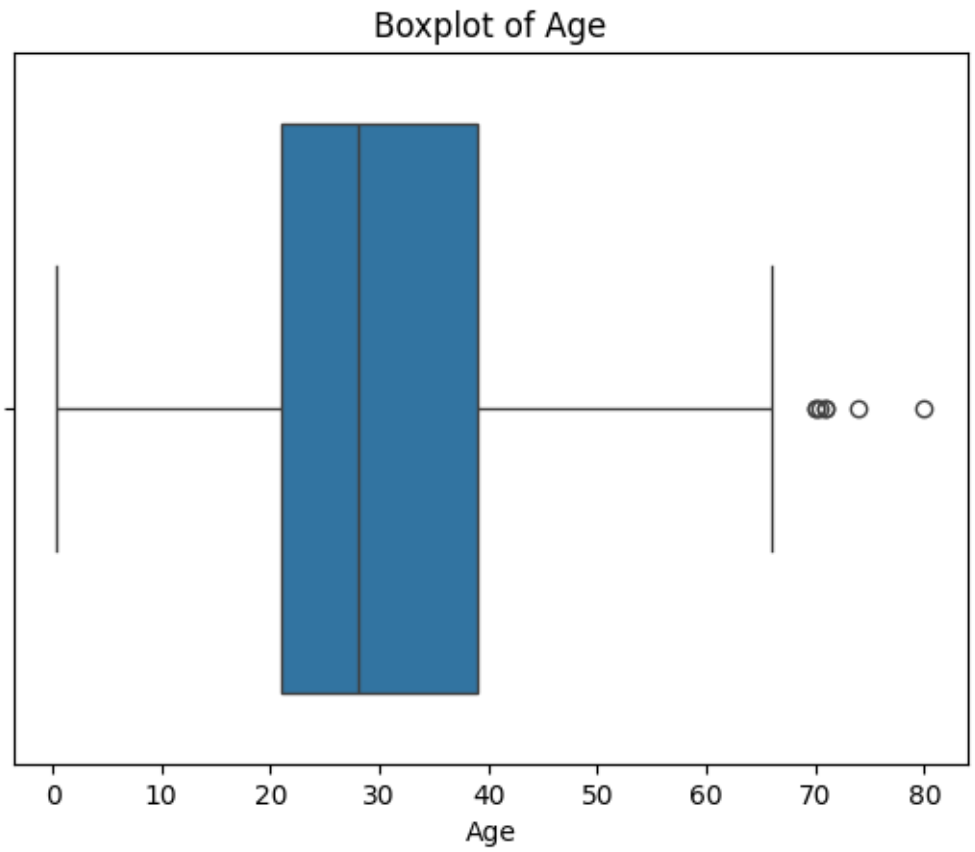
[16]:
```
# Map 'Sex' column values to 'Male' and 'Female'
titanic_data['Gender'] = titanic_data['Sex'].map({1: 'Male', 0: 'Female'})

# Gender distribution plot with survival coloring (count plot for distribution)
plt.figure(figsize=(7,5))
sns.countplot(x='Gender', hue='Survived', data=titanic_data, palette=['red',␣
 ↪'green'])  # Use 'palette' instead of 'color' to set different colors
plt.title('Gender Distribution with Survival Status')
plt.xlabel('Gender')
plt.ylabel('Count')
plt.legend(title='Survived', loc='upper right')  # Adjust legend position
plt.show()
```

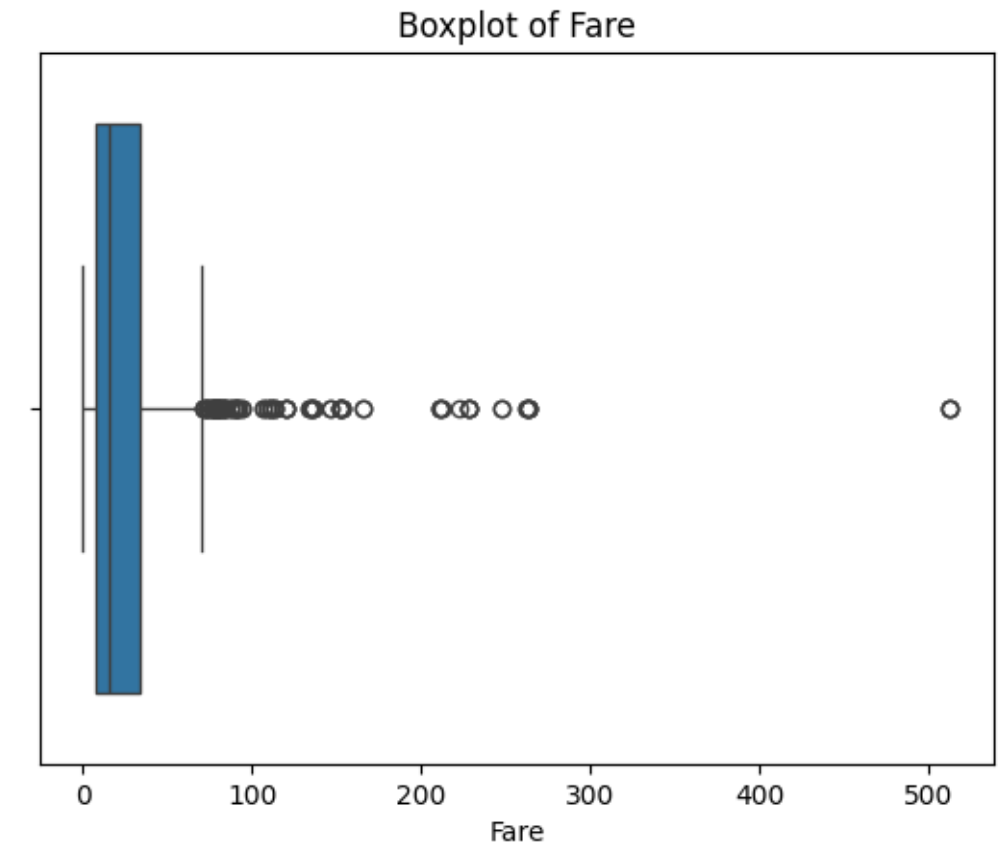


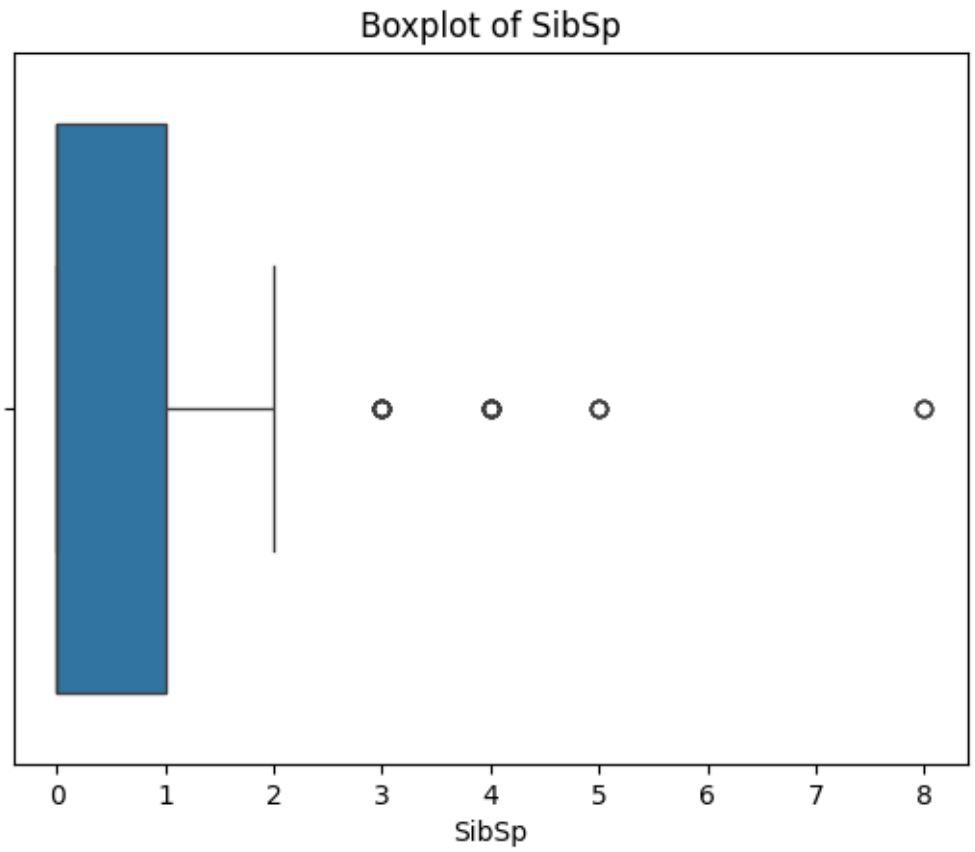
[17]:
```
# Grouping by 'FamilySize' and 'Survived', and plotting
family_size = titanic_data.groupby(['FamilySize', 'Survived']).size().unstack()

# Plotting the bar plot with correct colors for Survived and Not Survived
family_size.plot(kind='bar', figsize=(6,4), color=['red', 'green'])  # Use␣
 ↪'color' instead of 'palette'
plt.title('Survival Rate by Family Size')
plt.xlabel('Family Size')
plt.ylabel('Count')
plt.legend(title='Survived', loc='upper right')  # Add a legend for clarity
plt.show()
```

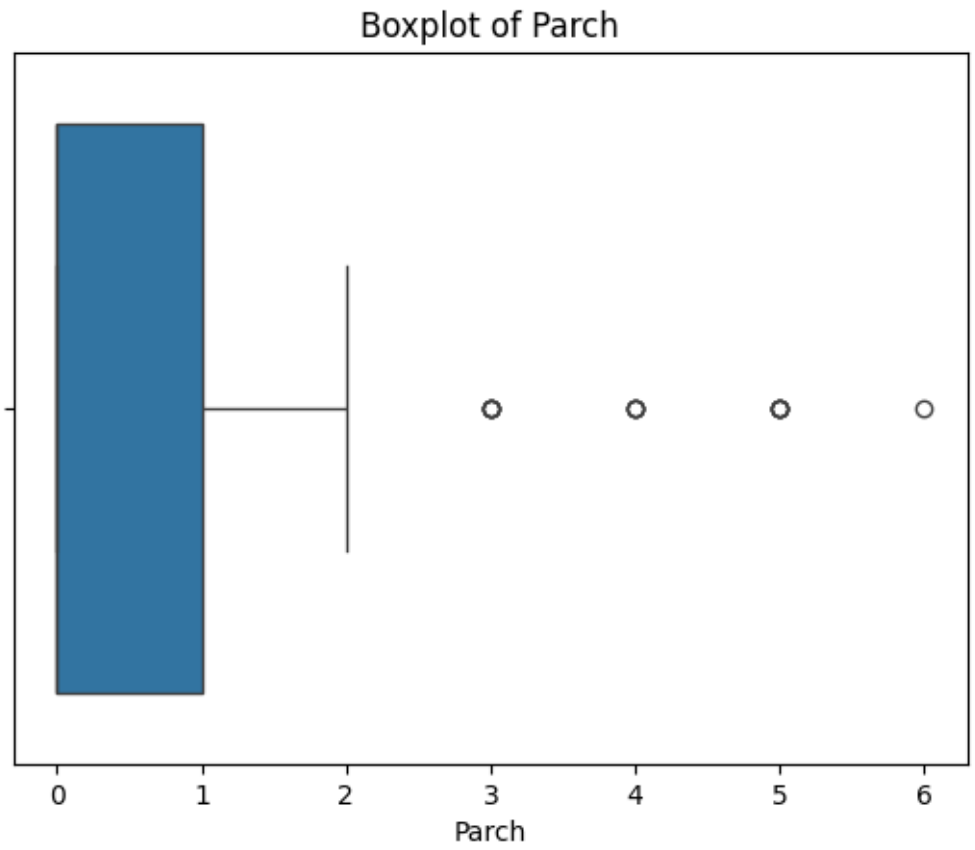


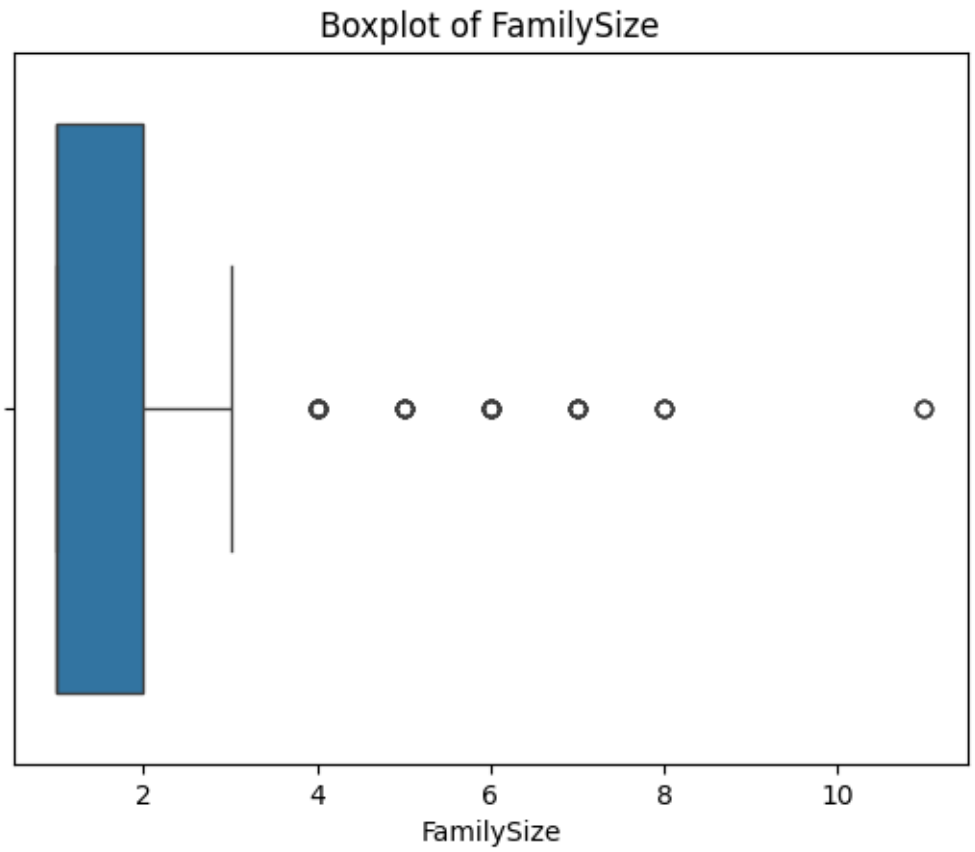
[18]:
```
# Select the most relevant features from your dataset
selected_feature = ['Age', 'Fare', 'SibSp', 'Parch', 'FamilySize']

# Plotting box plot for numeric columns
for column in selected_feature:
  sns.boxplot(x=titanic_data[column])
  plt.title(f'Boxplot of {column}')
  plt.show()
```


Boxplot of Age
0
10
20
30
40
50
60
70
80
Age

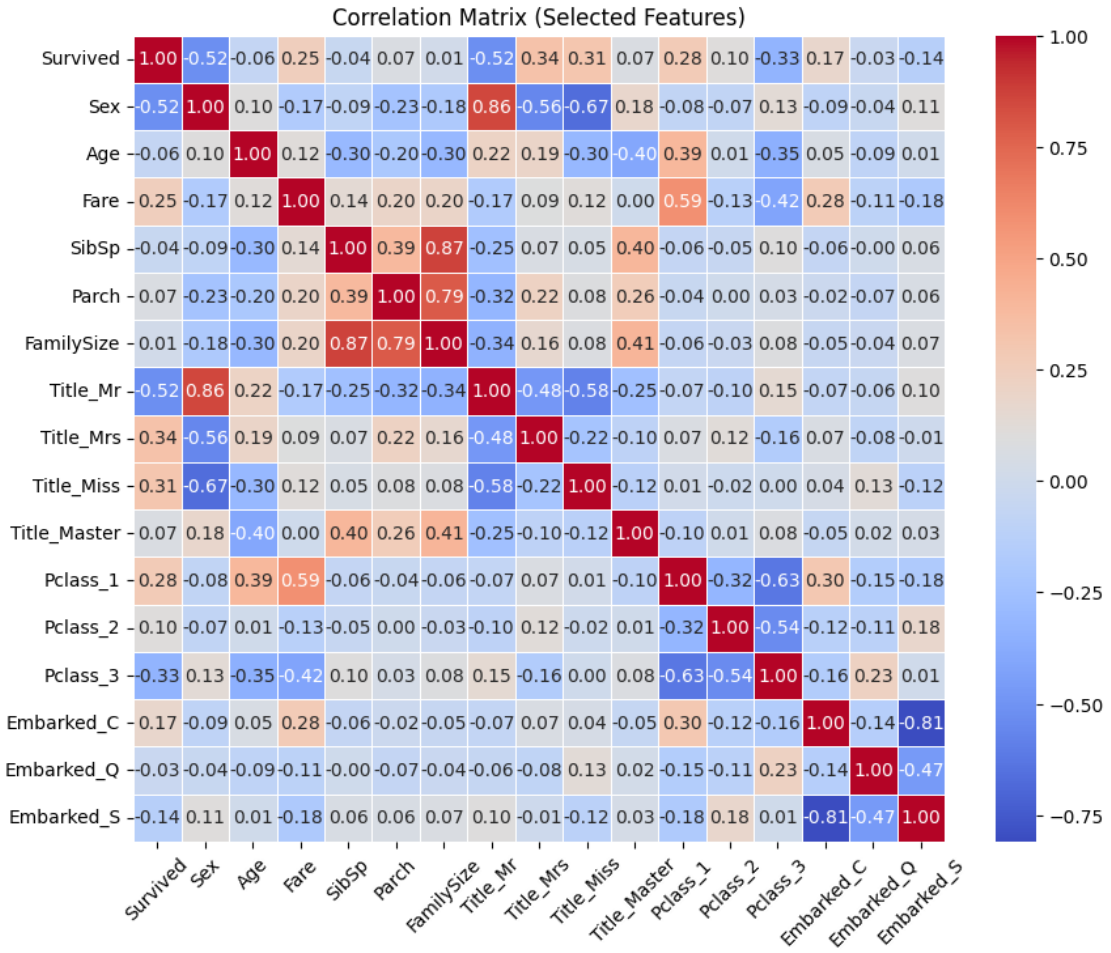

Boxplot of Fare
0
100
200
300
400
500
Fare


Boxplot of SibSp
0
1
2
3
4
5
6
7
8
SibSp


Boxplot of Parch
0
1
2
3
4
5
6
Parch



[19]:
```
# Select the most relevant features from your dataset
selected_features = [
    'Survived', 'Sex', 'Age', 'Fare', 'SibSp', 'Parch', 'FamilySize',
    'Title_Mr', 'Title_Mrs', 'Title_Miss', 'Title_Master',
    'Pclass_1', 'Pclass_2', 'Pclass_3',
    'Embarked_C', 'Embarked_Q', 'Embarked_S'
]

# Calculate the correlation matrix for the selected features
corr_matrix = titanic_data[selected_features].corr()

# Plot the correlation matrix
plt.figure(figsize=(10, 8))
sns.heatmap(corr_matrix, annot=True, fmt='.2f', cmap='coolwarm', linewidths=0.5)
plt.xticks(rotation=45)
plt.title('Correlation Matrix (Selected Features)')
plt.show()
```



1.3 Feature Engineering

[20]:
```
# Creating Sex_Pclass Column
def combine_sex_pclass(row):
    if row['Pclass_1'] == 1:
        return str(row['Sex']) + '_1stClass'
    elif row['Pclass_2'] == 1:
        return str(row['Sex']) + '_2ndClass'
    elif row['Pclass_3'] == 1:
        return str(row['Sex']) + '_3rdClass'

# Apply the function to create the combined feature
titanic_data['Sex_Pclass'] = titanic_data.apply(combine_sex_pclass, axis=1)
```

[21]:
```
titanic_data['IsMan'] = ((titanic_data['Sex'] == 1) & (titanic_data['Title_Mr']␣
↪== 1)).astype(int)
```

```
titanic_data['FareClassRatio'] = titanic_data['Fare'] /␣
 ↪(titanic_data['Pclass_1'] +
                                                      2 *␣
 ↪titanic_data['Pclass_2'] +
                                                      3 *␣
 ↪titanic_data['Pclass_3'])
```

[22]:
```
titanic_data['Age'] = titanic_data['Age']**2
titanic_data['Fare'] = titanic_data['Fare']**2
```

[23]:
```
# Perform one-hot encoding on the 'Sex_Pclass' column
titanic_data = pd.get_dummies(titanic_data, columns=['Sex_Pclass'],␣
 ↪drop_first=True)
titanic_data = titanic_data.drop(['Gender'], axis=1)

# Convert True/False to 1/0 for the one-hot encoded columns
titanic_data = titanic_data.astype(int)

# Drop the original Sex and Pclass columns if they still exist
titanic_data = titanic_data.drop(['Sex', 'Pclass_1', 'Pclass_2', 'Pclass_3',␣
 ↪'Fare', 'Parch', 'SibSp', 'Title_Mr', 'Embarked_C'], axis=1, errors='ignore')
```

[24]:
```
# Outliers

def treat_outliers(df, features):
    df_filtered = df.copy()
    for column in features:
        Q1 = df_filtered[column].quantile(0.25)
        Q3 = df_filtered[column].quantile(0.75)
        IQR = Q3 - Q1
        lower_bound = Q1 - 1.5 * IQR
        upper_bound = Q3 + 1.5 * IQR
        df_filtered = df_filtered[(df_filtered[column] >= lower_bound) &␣
 ↪(df_filtered[column] <= upper_bound)]
    return df_filtered


features= ['FamilySize', 'Age']
data_cleaned = treat_outliers(titanic_data, features)
data_cleaned
```

[24]:

	Age	Title_Master	Title_Miss	Title_Mrs	Title_Officer	Title_Royalty	\
0	484	0	0	0	0	0	
1	1444	0	0	1	0	0	
2	676	0	1	0	0	0	
3	1225	0	0	1	0	0	
4	1225	0	0	0	0	0	

```
..    …            …          …         …            …             …
883   784            0          0         0            0             0
886   729            0          0         0            1             0
887   361            0          1         0            0             0
889   676            0          0         0            0             0
890  1024            0          0         0            0             0

     Embarked_Q  Embarked_S  Cabin_A  Cabin_B  …  SmallFamily  LargeFamily  \
0             0           1        0        0  …            1            0
1             0           0        0        0  …            1            0
2             0           1        0        0  …            0            0
3             0           1        0        0  …            1            0
4             0           1        0        0  …            0            0
..          …           …        …        …  …          …           …
883           0           1        0        0  …            0            0
886           0           1        0        0  …            0            0
887           0           1        0        1  …            0            0
889           0           0        0        0  …            0            0
890           1           0        0        0  …            0            0

     Survived  IsMan  FareClassRatio  Sex_Pclass_0_2ndClass  \
0           0      1               2                      0
1           1      0              71                      0
2           1      0               2                      0
3           1      0              53                      0
4           0      1               2                      0
..        …    …             …                    …
883         0      1               5                      0
886         0      0               6                      0
887         1      0              30                      0
889         1      1              30                      0
890         0      1               2                      0

     Sex_Pclass_0_3rdClass  Sex_Pclass_1_1stClass  Sex_Pclass_1_2ndClass  \
0                        0                      0                      0
1                        0                      0                      0
2                        1                      0                      0
3                        0                      0                      0
4                        0                      0                      0
..                     …                      …                    …
883                      0                      0                      1
886                      0                      0                      1
887                      0                      0                      0
889                      0                      1                      0
890                      0                      0                      0

     Sex_Pclass_1_3rdClass
```

```
0                        1
1                        0
2                        0
3                        0
4                        1
..                     ...
883                      0
886                      0
887                      0
889                      0
890                      1

[680 rows x 67 columns]
```

[25]:
```
titanic_data
```

[25]:
```
      Age  Title_Master  Title_Miss  Title_Mrs  Title_Officer  Title_Royalty  \
0     484             0           0          0              0              0
1    1444             0           0          1              0              0
2     676             0           1          0              0              0
3    1225             0           0          1              0              0
4    1225             0           0          0              0              0
..    ...           ...         ...        ...            ...            ...
886   729             0           0          0              1              0
887   361             0           1          0              0              0
888   324             0           1          0              0              0
889   676             0           0          0              0              0
890  1024             0           0          0              0              0

     Embarked_Q  Embarked_S  Cabin_A  Cabin_B  ...  SmallFamily  LargeFamily  \
0             0           1        0        0  ...            1            0
1             0           0        0        0  ...            1            0
2             0           1        0        0  ...            0            0
3             0           1        0        0  ...            1            0
4             0           1        0        0  ...            0            0
..          ...         ...      ...      ...  ...          ...          ...
886           0           1        0        0  ...            0            0
887           0           1        0        1  ...            0            0
888           0           1        0        0  ...            1            0
889           0           0        0        0  ...            0            0
890           1           0        0        0  ...            0            0

     Survived  IsMan  FareClassRatio  Sex_Pclass_0_2ndClass  \
0           0      1               2                      0
1           1      0              71                      0
2           1      0               2                      0
3           1      0              53                      0
```

```
4           0      1               2                      0
..        …    …             …                    …
886         0      0               6                      0
887         1      0              30                      0
888         0      0               7                      0
889         1      1              30                      0
890         0      1               2                      0

     Sex_Pclass_0_3rdClass  Sex_Pclass_1_1stClass  Sex_Pclass_1_2ndClass  \
0                        0                      0                      0
1                        0                      0                      0
2                        1                      0                      0
3                        0                      0                      0
4                        0                      0                      0
..                     …                    …                    …
886                      0                      0                      1
887                      0                      0                      0
888                      1                      0                      0
889                      0                      1                      0
890                      0                      0                      0

     Sex_Pclass_1_3rdClass
0                        1
1                        0
2                        0
3                        0
4                        1
..                     …
886                      0
887                      0
888                      0
889                      0
890                      1

[796 rows x 67 columns]
```

[26]:
```
# titanic_data.drop(['Gender', 'SibSp', 'Parch', 'Sex'], axis=1, inplace= True)
```

[27]:
```
def min_max_scale(df, transform_columns):
    transformed_df = df.copy()  # Copy the original dataframe to avoid␣
 ↪modifying it directly
    normalization_params = {}  # Dictionary to store min and max values for␣
 ↪each column

    # Iterate over only the columns that need to be transformed
    for col in transform_columns:
        if col in transformed_df.columns:
```

```
            min_val = transformed_df[col].min()  # Find the minimum value of␣
 ↪the column
            max_val = transformed_df[col].max()  # Find the maximum value of␣
 ↪the column
            transformed_df[col] = (transformed_df[col] - min_val) / (max_val -␣
 ↪min_val)  # Apply min-max scaling
            normalization_params[col] = {'min_val': min_val, 'max_val':␣
 ↪max_val}  # Store min-max values for potential inverse scaling

    return transformed_df, normalization_params

# Columns to transform
transform_columns = ['Age', 'SibSp', 'Parch', 'Fare', 'FamilySize']

# Apply normalization and capture the parameters used for each feature
data_scaled, normalization_params = min_max_scale(data_cleaned,␣
 ↪transform_columns)
```

[28]:
```
def train_test_split(data, test_size=0.2, random_seed=None):
    # Set a random seed for reproducibility
    if random_seed is not None:
        np.random.seed(random_seed)

    # Shuffle the data indices
    shuffled_indices = np.random.permutation(len(data))

    # Determine the size of the test set
    test_set_size = int(len(data) * test_size)

    # Split the indices into train and test
    test_indices = shuffled_indices[:test_set_size]
    train_indices = shuffled_indices[test_set_size:]

    # Create the train and test sets using the indices
    train_set = data.iloc[train_indices]
    test_set = data.iloc[test_indices]

    return train_set, test_set

# Example usage with your titanic_data DataFrame
train_data, test_data = train_test_split(data_scaled, test_size=0.2,␣
 ↪random_seed=42)
```

[29]:
```
X_train = train_data.drop(['Survived'], axis=1)
y_train = train_data['Survived']
X_test = test_data.drop(['Survived'], axis=1)
y_test = test_data['Survived']
```

[30]:
```
X_train
```

[30]:

```
          Age  Title_Master  Title_Miss  Title_Mrs  Title_Officer  \
889  0.208064             0           0          0              0
575  0.111111             0           0          0              0
881  0.335180             0           0          0              0
22   0.069252             0           1          0              0
617  0.208064             0           0          1              0
..        …            …         …         …            …
92   0.651277             0           0          0              0
135  0.162819             0           0          0              0
338  0.623269             0           0          0              0
556  0.709141             0           0          0              0
130  0.335180             0           0          0              0

     Title_Royalty  Embarked_Q  Embarked_S  Cabin_A  Cabin_B  …  Singleton  \
889              0           0           0        0        0  …          0
575              0           0           1        0        0  …          0
881              0           0           1        0        0  …          0
22               0           1           0        0        0  …          0
617              0           0           1        0        0  …          0
..             …         …         …       …      …  …        …
92               0           0           1        0        0  …          0
135              0           0           0        0        0  …          0
338              0           0           1        0        0  …          0
556              1           0           0        1        0  …          0
130              0           0           0        0        0  …          0

     SmallFamily  LargeFamily  IsMan  FareClassRatio  Sex_Pclass_0_2ndClass  \
889            0            0      1              30                      0
575            0            0      1               4                      0
881            0            0      1               2                      0
22             0            0      0               2                      0
617            1            0      0               5                      0
..           …          …    …            …                      …
92             1            0      1              61                      0
135            0            0      1               7                      0
338            0            0      1               2                      0
556            1            0      0              39                      0
130            0            0      1               2                      0

     Sex_Pclass_0_3rdClass  Sex_Pclass_1_1stClass  Sex_Pclass_1_2ndClass  \
889                      0                      1                      0
575                      0                      0                      0
881                      0                      0                      0
22                       1                      0                      0
617                      1                      0                      0
```

```
..                      …                   …                   …
92                      0                   1                   0
135                     0                   0                   1
338                     0                   0                   0
556                     0                   0                   0
130                     0                   0                   0

     Sex_Pclass_1_3rdClass
889                     0
575                     1
881                     1
22                      0
617                     0
..                      …
92                      0
135                     0
338                     1
556                     0
130                     1

[544 rows x 66 columns]
```

2 Modeling

[33]:
```
X_train=X_train.to_numpy()
X_test=X_test.to_numpy()
y_train=y_train.to_numpy()
y_test=y_test.to_numpy()
```

2.1 Binary Logistic Regression

[67]:
```
def sigmoid(h):
    return 1 / (1 + np.exp(-h))

def cross_entropy(y, p_hat):
    return -(1/len(y)) * np.sum(y * np.log(p_hat) + (1 - y) * np.log(1 - p_hat))

def accuracy(y, y_hat):
    return np.mean(y == y_hat)
```

[68]:
```
class LogisticRegression():
  def __init__(self, thresh = 0.5, l2_lambda=None, batch_size=None):
      self.l2_lambda = l2_lambda
      self.batch_size = batch_size
      self.thresh = thresh
```

```
      self.W = None
      self.b = None

  def fit(self, X, y, eta=1e-3, epochs= 1e3, show_curve=False):
    epochs= int(epochs)
    N, D = X.shape

    #Initialize weights and biases
    self.W = np.random.randn(D)
    self.b = np.random.randn(1)
    #Create zero valued container for 3
    J = np.zeros(epochs)

    #SGD
    for epoch in range(epochs):
      p_hat = self.__forward__(X)
      J[epoch] = cross_entropy(y, p_hat)

      #Weight and biases Update Rules
      self.W -= eta * (1/N) * X.T@(p_hat - y)
      self.b -= eta * (1/N) * np.sum(p_hat - y)

    if show_curve:
          plt.figure()
          plt.plot(J)
          plt.xlabel("Epochs")
          plt.ylabel("$\mathcal{J}$")
          plt.title("Training Curve")

  def __forward__(self, X):
    return sigmoid(X@self.W + self.b)

  def predict(self, X):
    return (self.__forward__(X)>= self.thresh).astype(np.int32)
```

[69]:
```
# Function to train multiple logistic regression models with different␣
↪hyperparameters
def train_multiple_log_reg(X_train, y_train, X_test, y_test, epochs_list,␣
↪eta_list):
    best_accuracy = 0
    best_params = (None, None)

    for epochs in epochs_list:
        for eta in eta_list:
            # Initialize and train the model
            log_reg = LogisticRegression()
```

```
            log_reg.fit(X_train, y_train, epochs=epochs, eta=eta,␣
 ↪show_curve=False)

            # Predict on the test set
            y_hat = log_reg.predict(X_test)

            # Calculate accuracy
            accuracy = np.mean(y_hat == y_test)

            # Update best accuracy and parameters
            if accuracy > best_accuracy:
                best_accuracy = accuracy
                best_params = (epochs, eta)

    # Print and return only the best results
    print(f"Best Accuracy: {best_accuracy:.2f} with epochs={best_params[0]} and␣
 ↪eta={best_params[1]}")
    return best_params, best_accuracy

# Example usage with epochs and eta values
epochs_list = [1000, 5000, 10000, 20000]
eta_list = [0.1, 0.01, 0.001, 0.0001, 0.00001]

# Assuming X_train, y_train, X_test, y_test are your train-test split datasets
best_params, best_accuracy = train_multiple_log_reg(X_train, y_train, X_test,␣
 ↪y_test, epochs_list, eta_list)
```

```
<ipython-input-67-ff9729a12cfa>:5: RuntimeWarning: divide by zero encountered in
log
  return -(1/len(y)) * np.sum(y * np.log(p_hat) + (1 - y) * np.log(1 - p_hat))
<ipython-input-67-ff9729a12cfa>:5: RuntimeWarning: invalid value encountered in
multiply
  return -(1/len(y)) * np.sum(y * np.log(p_hat) + (1 - y) * np.log(1 - p_hat))
<ipython-input-67-ff9729a12cfa>:2: RuntimeWarning: overflow encountered in exp
  return 1 / (1 + np.exp(-h))
```

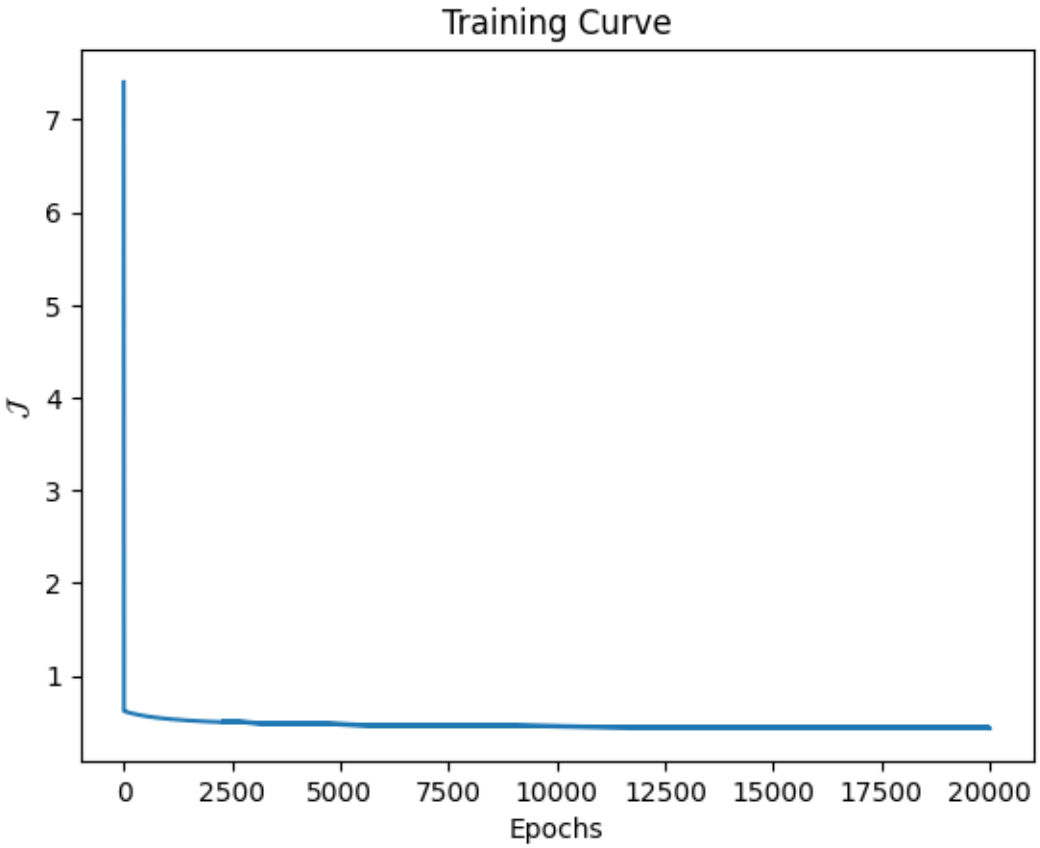
```
Best Accuracy: 0.84 with epochs=20000 and eta=0.1
```

[72]:
```
# Function to train multiple logistic regression models with different␣
 ↪hyperparameters
def train_multiple_log_reg(X_train, y_train, X_test, y_test, epochs_list,␣
 ↪eta_list):
    best_accuracy = 0
    best_params = (None, None)
    best_model = None  # To store the best model

    for epochs in epochs_list:
```

```
        for eta in eta_list:
            # Initialize and train the model
            log_reg = LogisticRegression()
            log_reg.fit(X_train, y_train, epochs=epochs, eta=eta,␣
 ↪show_curve=False)  # Show curve is False during search

            # Predict on the test set
            y_hat = log_reg.predict(X_test)

            # Calculate accuracy
            accuracy = np.mean(y_hat == y_test)

            # Update best accuracy and parameters
            if accuracy > best_accuracy:
                best_accuracy = accuracy
                best_params = (epochs, eta)
                best_model = log_reg  # Save the best model

    # After identifying the best model, train it again with show_curve=True
    print(f"\nTraining the best model with epochs={best_params[0]} and␣
 ↪eta={best_params[1]} and showing the curve.")
    best_model.fit(X_train, y_train, epochs=best_params[0], eta=best_params[1],␣
 ↪show_curve=True)

    # Print and return only the best results
    print(f"Best Accuracy: {best_accuracy:.2f} with epochs={best_params[0]} and␣
 ↪eta={best_params[1]}")
    return best_params, best_accuracy

# Example usage with epochs and eta values
epochs_list = [1000, 5000, 10000, 20000]
eta_list = [0.1, 0.01, 0.001, 0.0001, 0.00001]

# Assuming X_train, y_train, X_test, y_test are your train-test split datasets
best_params, best_accuracy = train_multiple_log_reg(X_train, y_train, X_test,␣
 ↪y_test, epochs_list, eta_list)
```

```
<ipython-input-67-ff9729a12cfa>:5: RuntimeWarning: divide by zero encountered in
log
  return -(1/len(y)) * np.sum(y * np.log(p_hat) + (1 - y) * np.log(1 - p_hat))
<ipython-input-67-ff9729a12cfa>:5: RuntimeWarning: invalid value encountered in
multiply
  return -(1/len(y)) * np.sum(y * np.log(p_hat) + (1 - y) * np.log(1 - p_hat))
<ipython-input-67-ff9729a12cfa>:2: RuntimeWarning: overflow encountered in exp
  return 1 / (1 + np.exp(-h))


Training the best model with epochs=20000 and eta=0.01 and showing the curve.
```

```
Best Accuracy: 0.82 with epochs=20000 and eta=0.01
```



[37]:
```python
# Function to train multiple logistic regression models with different␣
↪hyperparameters, including regularization
def train_multiple_log_reg(X_train, y_train, X_test, y_test, epochs_list,␣
↪eta_list, l2_lambda_list=None, batch_size_list=None):
    best_accuracy = 0
    best_params = (None, None, None, None)

    # Set default values for L2 regularization and batch size if not provided
    if l2_lambda_list is None:
        l2_lambda_list = [0]  # No L2 regularization by default
    if batch_size_list is None:
        batch_size_list = [len(X_train)]  # Use full batch (no mini-batch) by␣
↪default

    # Iterate over combinations of hyperparameters
    for epochs in epochs_list:
        for eta in eta_list:
            for l2_lambda in l2_lambda_list:
```

```
                for batch_size in batch_size_list:
                    print(f"\nTraining with epochs={epochs}, eta={eta}, L2␣
↪lambda={l2_lambda}, batch_size={batch_size}")

                    # Initialize the model with the current hyperparameters
                    log_reg = LogisticRegression(l2_lambda=l2_lambda,␣
↪batch_size=batch_size)

                    # Train the model and print accuracy after each epoch
                    for epoch in range(1, epochs + 1):
                        log_reg.fit(X_train, y_train, epochs=1, eta=eta,␣
↪show_curve=False)  # Train for 1 epoch at a time
                        y_hat = log_reg.predict(X_test)

                        # Calculate accuracy
                        accuracy = np.mean(y_hat == y_test)
                        print(f"Epoch {epoch}/{epochs}: Accuracy = {accuracy:.
↪4f}")

                        # Update best accuracy and parameters if better␣
↪accuracy is found
                        if accuracy > best_accuracy:
                            best_accuracy = accuracy
                            best_params = (epochs, eta, l2_lambda, batch_size)

    # Print and return the best results
    print(f"\nBest Accuracy: {best_accuracy:.4f} with epochs={best_params[0]},␣
↪eta={best_params[1]}, L2 lambda={best_params[2]}, and␣
↪batch_size={best_params[3]}")
    return best_params, best_accuracy

# Example usage with additional hyperparameters
epochs_list = [1000, 5000, 10000, 20000]    # Example epoch values
eta_list = [0.1, 0.01, 0.001, 0.0001] # Example learning rates
l2_lambda_list = [0, 1e-4, 1e-2, 1e-1]  # L2 regularization values
batch_size_list = [16, 32, 64]  # Batch sizes for mini-batch gradient descent␣
↪(or full batch)

# Assuming X_train, y_train, X_test, y_test are your train-test split datasets
best_params, best_accuracy = train_multiple_log_reg(X_train, y_train, X_test,␣
↪y_test, epochs_list, eta_list, l2_lambda_list, batch_size_list)
```

```
Training with epochs=1000, eta=0.1, L2 lambda=0, batch_size=16
Epoch 1/1000: Accuracy = 0.4412
Epoch 2/1000: Accuracy = 0.5515
Epoch 3/1000: Accuracy = 0.3750
```

```
Epoch 4/1000: Accuracy = 0.3824
Epoch 5/1000: Accuracy = 0.3824
Epoch 6/1000: Accuracy = 0.3824
Epoch 7/1000: Accuracy = 0.4485
Epoch 8/1000: Accuracy = 0.3750
Epoch 9/1000: Accuracy = 0.3824
Epoch 10/1000: Accuracy = 0.5735
Epoch 11/1000: Accuracy = 0.5956
Epoch 12/1000: Accuracy = 0.4926
Epoch 13/1000: Accuracy = 0.3750
Epoch 14/1000: Accuracy = 0.4265
Epoch 15/1000: Accuracy = 0.3824
Epoch 16/1000: Accuracy = 0.4412
Epoch 17/1000: Accuracy = 0.3750
Epoch 18/1000: Accuracy = 0.6176
Epoch 19/1000: Accuracy = 0.5221
Epoch 20/1000: Accuracy = 0.5809
Epoch 21/1000: Accuracy = 0.3382
Epoch 22/1000: Accuracy = 0.4044
Epoch 23/1000: Accuracy = 0.4338
Epoch 24/1000: Accuracy = 0.6324
Epoch 25/1000: Accuracy = 0.3824
Epoch 26/1000: Accuracy = 0.3750
Epoch 27/1000: Accuracy = 0.6176
Epoch 28/1000: Accuracy = 0.5882
Epoch 29/1000: Accuracy = 0.6029
Epoch 30/1000: Accuracy = 0.6250
Epoch 31/1000: Accuracy = 0.3824
Epoch 32/1000: Accuracy = 0.4191
Epoch 33/1000: Accuracy = 0.3897
Epoch 34/1000: Accuracy = 0.4559
Epoch 35/1000: Accuracy = 0.5074
Epoch 36/1000: Accuracy = 0.6103
Epoch 37/1000: Accuracy = 0.5882
Epoch 38/1000: Accuracy = 0.5441
Epoch 39/1000: Accuracy = 0.3971
Epoch 40/1000: Accuracy = 0.4265
Epoch 41/1000: Accuracy = 0.5294
Epoch 42/1000: Accuracy = 0.3897
Epoch 43/1000: Accuracy = 0.3750
Epoch 44/1000: Accuracy = 0.3824
Epoch 45/1000: Accuracy = 0.4118
Epoch 46/1000: Accuracy = 0.6176
Epoch 47/1000: Accuracy = 0.3750
Epoch 48/1000: Accuracy = 0.4044
Epoch 49/1000: Accuracy = 0.3897
Epoch 50/1000: Accuracy = 0.6324
Epoch 51/1000: Accuracy = 0.6176
```

```
Epoch 52/1000: Accuracy = 0.3750
Epoch 53/1000: Accuracy = 0.5882
Epoch 54/1000: Accuracy = 0.3824
Epoch 55/1000: Accuracy = 0.5956
Epoch 56/1000: Accuracy = 0.3676
Epoch 57/1000: Accuracy = 0.5809
Epoch 58/1000: Accuracy = 0.3824
Epoch 59/1000: Accuracy = 0.3309
Epoch 60/1000: Accuracy = 0.5662
Epoch 61/1000: Accuracy = 0.6471
Epoch 62/1000: Accuracy = 0.3971
Epoch 63/1000: Accuracy = 0.4559
Epoch 64/1000: Accuracy = 0.3750
Epoch 65/1000: Accuracy = 0.3971
Epoch 66/1000: Accuracy = 0.5956
Epoch 67/1000: Accuracy = 0.4853
Epoch 68/1000: Accuracy = 0.3603
Epoch 69/1000: Accuracy = 0.3824
Epoch 70/1000: Accuracy = 0.7059
Epoch 71/1000: Accuracy = 0.6544
Epoch 72/1000: Accuracy = 0.3750
Epoch 73/1000: Accuracy = 0.6250
Epoch 74/1000: Accuracy = 0.5882
Epoch 75/1000: Accuracy = 0.3750
Epoch 76/1000: Accuracy = 0.3971
Epoch 77/1000: Accuracy = 0.3824
Epoch 78/1000: Accuracy = 0.3676
Epoch 79/1000: Accuracy = 0.5147
Epoch 80/1000: Accuracy = 0.3897
Epoch 81/1000: Accuracy = 0.5956
Epoch 82/1000: Accuracy = 0.4191
Epoch 83/1000: Accuracy = 0.3824
Epoch 84/1000: Accuracy = 0.3676
Epoch 85/1000: Accuracy = 0.5809
Epoch 86/1000: Accuracy = 0.4191
Epoch 87/1000: Accuracy = 0.5294
Epoch 88/1000: Accuracy = 0.5956
Epoch 89/1000: Accuracy = 0.3971
Epoch 90/1000: Accuracy = 0.3897
Epoch 91/1000: Accuracy = 0.3529
Epoch 92/1000: Accuracy = 0.6176
Epoch 93/1000: Accuracy = 0.3824
Epoch 94/1000: Accuracy = 0.4412
Epoch 95/1000: Accuracy = 0.6544
Epoch 96/1000: Accuracy = 0.5809
Epoch 97/1000: Accuracy = 0.3971
Epoch 98/1000: Accuracy = 0.3750
Epoch 99/1000: Accuracy = 0.3897
```

```
Epoch 100/1000: Accuracy = 0.5294
Epoch 101/1000: Accuracy = 0.3676
Epoch 102/1000: Accuracy = 0.3897
Epoch 103/1000: Accuracy = 0.4779
Epoch 104/1000: Accuracy = 0.5956
Epoch 105/1000: Accuracy = 0.3824
Epoch 106/1000: Accuracy = 0.3971
Epoch 107/1000: Accuracy = 0.5441
Epoch 108/1000: Accuracy = 0.4044
Epoch 109/1000: Accuracy = 0.4044
Epoch 110/1000: Accuracy = 0.4779
Epoch 111/1000: Accuracy = 0.3750
Epoch 112/1000: Accuracy = 0.5588
Epoch 113/1000: Accuracy = 0.4265
Epoch 114/1000: Accuracy = 0.3897
Epoch 115/1000: Accuracy = 0.5882
Epoch 116/1000: Accuracy = 0.4338
Epoch 117/1000: Accuracy = 0.3824
Epoch 118/1000: Accuracy = 0.6324
Epoch 119/1000: Accuracy = 0.4118
Epoch 120/1000: Accuracy = 0.4265
Epoch 121/1000: Accuracy = 0.5515
Epoch 122/1000: Accuracy = 0.5662
Epoch 123/1000: Accuracy = 0.5956
Epoch 124/1000: Accuracy = 0.3824
Epoch 125/1000: Accuracy = 0.3824
Epoch 126/1000: Accuracy = 0.3529
Epoch 127/1000: Accuracy = 0.5662
Epoch 128/1000: Accuracy = 0.3750
Epoch 129/1000: Accuracy = 0.3750
Epoch 130/1000: Accuracy = 0.6029
Epoch 131/1000: Accuracy = 0.6471
Epoch 132/1000: Accuracy = 0.3750
Epoch 133/1000: Accuracy = 0.5956
Epoch 134/1000: Accuracy = 0.3897
Epoch 135/1000: Accuracy = 0.3897
Epoch 136/1000: Accuracy = 0.3824
Epoch 137/1000: Accuracy = 0.4706
Epoch 138/1000: Accuracy = 0.6397
Epoch 139/1000: Accuracy = 0.4118
Epoch 140/1000: Accuracy = 0.3824
Epoch 141/1000: Accuracy = 0.3750
Epoch 142/1000: Accuracy = 0.6397
Epoch 143/1000: Accuracy = 0.6103
Epoch 144/1000: Accuracy = 0.4191
Epoch 145/1000: Accuracy = 0.3971
Epoch 146/1000: Accuracy = 0.3824
Epoch 147/1000: Accuracy = 0.4191
```

```
Epoch 148/1000: Accuracy = 0.5147
Epoch 149/1000: Accuracy = 0.3897
Epoch 150/1000: Accuracy = 0.5588
Epoch 151/1000: Accuracy = 0.6397
Epoch 152/1000: Accuracy = 0.5882
Epoch 153/1000: Accuracy = 0.3824
Epoch 154/1000: Accuracy = 0.6471
Epoch 155/1000: Accuracy = 0.5368
Epoch 156/1000: Accuracy = 0.3750
Epoch 157/1000: Accuracy = 0.3897
Epoch 158/1000: Accuracy = 0.6176
Epoch 159/1000: Accuracy = 0.5809
Epoch 160/1000: Accuracy = 0.7353
Epoch 161/1000: Accuracy = 0.3750
Epoch 162/1000: Accuracy = 0.3750
Epoch 163/1000: Accuracy = 0.3235
Epoch 164/1000: Accuracy = 0.6471
Epoch 165/1000: Accuracy = 0.6103
Epoch 166/1000: Accuracy = 0.4779
Epoch 167/1000: Accuracy = 0.3971
Epoch 168/1000: Accuracy = 0.5809
Epoch 169/1000: Accuracy = 0.4706
Epoch 170/1000: Accuracy = 0.6765
Epoch 171/1000: Accuracy = 0.6397
Epoch 172/1000: Accuracy = 0.6103
Epoch 173/1000: Accuracy = 0.6618
Epoch 174/1000: Accuracy = 0.4559
Epoch 175/1000: Accuracy = 0.3824
Epoch 176/1000: Accuracy = 0.6103
Epoch 177/1000: Accuracy = 0.3456
Epoch 178/1000: Accuracy = 0.6176
Epoch 179/1000: Accuracy = 0.6103
Epoch 180/1000: Accuracy = 0.3824
Epoch 181/1000: Accuracy = 0.4559
Epoch 182/1000: Accuracy = 0.5074
Epoch 183/1000: Accuracy = 0.3750
Epoch 184/1000: Accuracy = 0.3382
Epoch 185/1000: Accuracy = 0.4338
Epoch 186/1000: Accuracy = 0.3750
Epoch 187/1000: Accuracy = 0.4779
Epoch 188/1000: Accuracy = 0.3456
Epoch 189/1000: Accuracy = 0.4044
Epoch 190/1000: Accuracy = 0.3309
Epoch 191/1000: Accuracy = 0.3750
Epoch 192/1000: Accuracy = 0.4779
Epoch 193/1000: Accuracy = 0.5221
Epoch 194/1000: Accuracy = 0.4118
Epoch 195/1000: Accuracy = 0.5441
```

```
Epoch 196/1000: Accuracy = 0.3897
Epoch 197/1000: Accuracy = 0.3750
Epoch 198/1000: Accuracy = 0.4338
Epoch 199/1000: Accuracy = 0.4853
Epoch 200/1000: Accuracy = 0.3750
Epoch 201/1000: Accuracy = 0.5294
Epoch 202/1000: Accuracy = 0.3824
Epoch 203/1000: Accuracy = 0.6103
```

```
<ipython-input-34-ff9729a12cfa>:5: RuntimeWarning: divide by zero encountered in
log
  return -(1/len(y)) * np.sum(y * np.log(p_hat) + (1 - y) * np.log(1 - p_hat))
<ipython-input-34-ff9729a12cfa>:5: RuntimeWarning: invalid value encountered in
multiply
  return -(1/len(y)) * np.sum(y * np.log(p_hat) + (1 - y) * np.log(1 - p_hat))
<ipython-input-34-ff9729a12cfa>:2: RuntimeWarning: overflow encountered in exp
  return 1 / (1 + np.exp(-h))
```

```
Streaming output truncated to the last 5000 lines.
Epoch 15003/20000: Accuracy = 0.6250
Epoch 15004/20000: Accuracy = 0.3824
Epoch 15005/20000: Accuracy = 0.4632
Epoch 15006/20000: Accuracy = 0.3897
Epoch 15007/20000: Accuracy = 0.4412
Epoch 15008/20000: Accuracy = 0.5662
Epoch 15009/20000: Accuracy = 0.3750
Epoch 15010/20000: Accuracy = 0.7059
Epoch 15011/20000: Accuracy = 0.3676
Epoch 15012/20000: Accuracy = 0.6176
Epoch 15013/20000: Accuracy = 0.4044
Epoch 15014/20000: Accuracy = 0.4118
Epoch 15015/20000: Accuracy = 0.7206
Epoch 15016/20000: Accuracy = 0.6250
Epoch 15017/20000: Accuracy = 0.6103
Epoch 15018/20000: Accuracy = 0.6397
Epoch 15019/20000: Accuracy = 0.3676
Epoch 15020/20000: Accuracy = 0.3824
Epoch 15021/20000: Accuracy = 0.6250
Epoch 15022/20000: Accuracy = 0.3971
Epoch 15023/20000: Accuracy = 0.3750
Epoch 15024/20000: Accuracy = 0.6176
Epoch 15025/20000: Accuracy = 0.6618
Epoch 15026/20000: Accuracy = 0.3824
Epoch 15027/20000: Accuracy = 0.6250
Epoch 15028/20000: Accuracy = 0.3750
Epoch 15029/20000: Accuracy = 0.3971
Epoch 15030/20000: Accuracy = 0.5956
Epoch 15031/20000: Accuracy = 0.3603
Epoch 15032/20000: Accuracy = 0.5294
```

```
Epoch 15033/20000: Accuracy = 0.6176
Epoch 15034/20000: Accuracy = 0.3897
Epoch 15035/20000: Accuracy = 0.6250
Epoch 15036/20000: Accuracy = 0.4044
Epoch 15037/20000: Accuracy = 0.6250
Epoch 15038/20000: Accuracy = 0.6176
Epoch 15039/20000: Accuracy = 0.6176
Epoch 15040/20000: Accuracy = 0.4706
Epoch 15041/20000: Accuracy = 0.5809
Epoch 15042/20000: Accuracy = 0.3676
Epoch 15043/20000: Accuracy = 0.3897
Epoch 15044/20000: Accuracy = 0.6250
Epoch 15045/20000: Accuracy = 0.5956
Epoch 15046/20000: Accuracy = 0.5956
Epoch 15047/20000: Accuracy = 0.6324
Epoch 15048/20000: Accuracy = 0.5147
Epoch 15049/20000: Accuracy = 0.3971
Epoch 15050/20000: Accuracy = 0.3676
Epoch 15051/20000: Accuracy = 0.3750
Epoch 15052/20000: Accuracy = 0.6250
Epoch 15053/20000: Accuracy = 0.6985
Epoch 15054/20000: Accuracy = 0.5956
Epoch 15055/20000: Accuracy = 0.3897
Epoch 15056/20000: Accuracy = 0.5956
Epoch 15057/20000: Accuracy = 0.6103
Epoch 15058/20000: Accuracy = 0.4338
Epoch 15059/20000: Accuracy = 0.5221
Epoch 15060/20000: Accuracy = 0.4044
Epoch 15061/20000: Accuracy = 0.3971
Epoch 15062/20000: Accuracy = 0.6029
Epoch 15063/20000: Accuracy = 0.3897
Epoch 15064/20000: Accuracy = 0.6324
Epoch 15065/20000: Accuracy = 0.3750
Epoch 15066/20000: Accuracy = 0.5662
Epoch 15067/20000: Accuracy = 0.6176
Epoch 15068/20000: Accuracy = 0.6471
Epoch 15069/20000: Accuracy = 0.6324
Epoch 15070/20000: Accuracy = 0.6176
Epoch 15071/20000: Accuracy = 0.4118
Epoch 15072/20000: Accuracy = 0.4338
Epoch 15073/20000: Accuracy = 0.5147
Epoch 15074/20000: Accuracy = 0.4485
Epoch 15075/20000: Accuracy = 0.2941
Epoch 15076/20000: Accuracy = 0.6912
Epoch 15077/20000: Accuracy = 0.3824
Epoch 15078/20000: Accuracy = 0.3750
Epoch 15079/20000: Accuracy = 0.3676
Epoch 15080/20000: Accuracy = 0.5515
```

```
Epoch 15081/20000: Accuracy = 0.4338
Epoch 15082/20000: Accuracy = 0.6029
Epoch 15083/20000: Accuracy = 0.4706
Epoch 15084/20000: Accuracy = 0.3750
Epoch 15085/20000: Accuracy = 0.6250
Epoch 15086/20000: Accuracy = 0.6103
Epoch 15087/20000: Accuracy = 0.6691
Epoch 15088/20000: Accuracy = 0.3897
Epoch 15089/20000: Accuracy = 0.3971
Epoch 15090/20000: Accuracy = 0.6103
Epoch 15091/20000: Accuracy = 0.3897
Epoch 15092/20000: Accuracy = 0.3088
Epoch 15093/20000: Accuracy = 0.4265
Epoch 15094/20000: Accuracy = 0.3235
Epoch 15095/20000: Accuracy = 0.3897
Epoch 15096/20000: Accuracy = 0.6176
Epoch 15097/20000: Accuracy = 0.4559
Epoch 15098/20000: Accuracy = 0.3824
Epoch 15099/20000: Accuracy = 0.6250
Epoch 15100/20000: Accuracy = 0.6397
Epoch 15101/20000: Accuracy = 0.6250
Epoch 15102/20000: Accuracy = 0.6250
Epoch 15103/20000: Accuracy = 0.3750
Epoch 15104/20000: Accuracy = 0.3750
Epoch 15105/20000: Accuracy = 0.3824
Epoch 15106/20000: Accuracy = 0.5662
Epoch 15107/20000: Accuracy = 0.6250
Epoch 15108/20000: Accuracy = 0.3676
Epoch 15109/20000: Accuracy = 0.5735
Epoch 15110/20000: Accuracy = 0.6103
Epoch 15111/20000: Accuracy = 0.6176
Epoch 15112/20000: Accuracy = 0.6029
Epoch 15113/20000: Accuracy = 0.6176
Epoch 15114/20000: Accuracy = 0.3750
Epoch 15115/20000: Accuracy = 0.4118
Epoch 15116/20000: Accuracy = 0.3897
Epoch 15117/20000: Accuracy = 0.3603
Epoch 15118/20000: Accuracy = 0.3897
Epoch 15119/20000: Accuracy = 0.5294
Epoch 15120/20000: Accuracy = 0.3750
Epoch 15121/20000: Accuracy = 0.6176
Epoch 15122/20000: Accuracy = 0.4338
Epoch 15123/20000: Accuracy = 0.6471
Epoch 15124/20000: Accuracy = 0.4044
Epoch 15125/20000: Accuracy = 0.4485
Epoch 15126/20000: Accuracy = 0.6176
Epoch 15127/20000: Accuracy = 0.6176
Epoch 15128/20000: Accuracy = 0.4926
```

```
Epoch 15129/20000: Accuracy = 0.6176
Epoch 15130/20000: Accuracy = 0.3750
Epoch 15131/20000: Accuracy = 0.5882
Epoch 15132/20000: Accuracy = 0.6029
Epoch 15133/20000: Accuracy = 0.4338
Epoch 15134/20000: Accuracy = 0.6250
Epoch 15135/20000: Accuracy = 0.3750
Epoch 15136/20000: Accuracy = 0.5515
Epoch 15137/20000: Accuracy = 0.3750
Epoch 15138/20000: Accuracy = 0.3750
Epoch 15139/20000: Accuracy = 0.6103
Epoch 15140/20000: Accuracy = 0.5588
Epoch 15141/20000: Accuracy = 0.3971
Epoch 15142/20000: Accuracy = 0.6176
Epoch 15143/20000: Accuracy = 0.6176
Epoch 15144/20000: Accuracy = 0.4412
Epoch 15145/20000: Accuracy = 0.3971
Epoch 15146/20000: Accuracy = 0.4632
Epoch 15147/20000: Accuracy = 0.6324
Epoch 15148/20000: Accuracy = 0.3824
Epoch 15149/20000: Accuracy = 0.3750
Epoch 15150/20000: Accuracy = 0.6691
Epoch 15151/20000: Accuracy = 0.3897
Epoch 15152/20000: Accuracy = 0.5000
Epoch 15153/20000: Accuracy = 0.4338
Epoch 15154/20000: Accuracy = 0.6029
Epoch 15155/20000: Accuracy = 0.4559
Epoch 15156/20000: Accuracy = 0.5809
Epoch 15157/20000: Accuracy = 0.4485
Epoch 15158/20000: Accuracy = 0.6176
Epoch 15159/20000: Accuracy = 0.5662
Epoch 15160/20000: Accuracy = 0.3897
Epoch 15161/20000: Accuracy = 0.3750
Epoch 15162/20000: Accuracy = 0.3824
Epoch 15163/20000: Accuracy = 0.5588
Epoch 15164/20000: Accuracy = 0.5735
Epoch 15165/20000: Accuracy = 0.6029
Epoch 15166/20000: Accuracy = 0.5882
Epoch 15167/20000: Accuracy = 0.5000
Epoch 15168/20000: Accuracy = 0.6103
Epoch 15169/20000: Accuracy = 0.4265
Epoch 15170/20000: Accuracy = 0.4118
Epoch 15171/20000: Accuracy = 0.3750
Epoch 15172/20000: Accuracy = 0.6250
Epoch 15173/20000: Accuracy = 0.3676
Epoch 15174/20000: Accuracy = 0.3603
Epoch 15175/20000: Accuracy = 0.6250
Epoch 15176/20000: Accuracy = 0.3456
```

```
Epoch 15177/20000: Accuracy = 0.6103
Epoch 15178/20000: Accuracy = 0.6250
Epoch 15179/20000: Accuracy = 0.3750
Epoch 15180/20000: Accuracy = 0.6176
Epoch 15181/20000: Accuracy = 0.3824
Epoch 15182/20000: Accuracy = 0.6176
Epoch 15183/20000: Accuracy = 0.5956
Epoch 15184/20000: Accuracy = 0.4926
Epoch 15185/20000: Accuracy = 0.3529
Epoch 15186/20000: Accuracy = 0.3824
Epoch 15187/20000: Accuracy = 0.6176
Epoch 15188/20000: Accuracy = 0.3750
Epoch 15189/20000: Accuracy = 0.6250
Epoch 15190/20000: Accuracy = 0.3971
Epoch 15191/20000: Accuracy = 0.7574
Epoch 15192/20000: Accuracy = 0.5735
Epoch 15193/20000: Accuracy = 0.6103
Epoch 15194/20000: Accuracy = 0.6691
Epoch 15195/20000: Accuracy = 0.6029
Epoch 15196/20000: Accuracy = 0.6544
Epoch 15197/20000: Accuracy = 0.6103
Epoch 15198/20000: Accuracy = 0.6544
Epoch 15199/20000: Accuracy = 0.3382
Epoch 15200/20000: Accuracy = 0.3750
Epoch 15201/20000: Accuracy = 0.6250
Epoch 15202/20000: Accuracy = 0.3750
Epoch 15203/20000: Accuracy = 0.6176
Epoch 15204/20000: Accuracy = 0.2941
Epoch 15205/20000: Accuracy = 0.6324
Epoch 15206/20000: Accuracy = 0.6103
Epoch 15207/20000: Accuracy = 0.3824
Epoch 15208/20000: Accuracy = 0.3603
Epoch 15209/20000: Accuracy = 0.6176
Epoch 15210/20000: Accuracy = 0.3824
Epoch 15211/20000: Accuracy = 0.3676
Epoch 15212/20000: Accuracy = 0.3750
Epoch 15213/20000: Accuracy = 0.3456
Epoch 15214/20000: Accuracy = 0.3897
Epoch 15215/20000: Accuracy = 0.5515
Epoch 15216/20000: Accuracy = 0.6250
Epoch 15217/20000: Accuracy = 0.3824
Epoch 15218/20000: Accuracy = 0.5735
Epoch 15219/20000: Accuracy = 0.6397
Epoch 15220/20000: Accuracy = 0.6985
Epoch 15221/20000: Accuracy = 0.6397
Epoch 15222/20000: Accuracy = 0.3897
Epoch 15223/20000: Accuracy = 0.4191
Epoch 15224/20000: Accuracy = 0.6250
```

```
Epoch 15225/20000: Accuracy = 0.6103
Epoch 15226/20000: Accuracy = 0.3235
Epoch 15227/20000: Accuracy = 0.6250
Epoch 15228/20000: Accuracy = 0.4191
Epoch 15229/20000: Accuracy = 0.5809
Epoch 15230/20000: Accuracy = 0.3529
Epoch 15231/20000: Accuracy = 0.4118
Epoch 15232/20000: Accuracy = 0.5662
Epoch 15233/20000: Accuracy = 0.6176
Epoch 15234/20000: Accuracy = 0.4559
Epoch 15235/20000: Accuracy = 0.4044
Epoch 15236/20000: Accuracy = 0.5882
Epoch 15237/20000: Accuracy = 0.6250
Epoch 15238/20000: Accuracy = 0.6029
Epoch 15239/20000: Accuracy = 0.6250
Epoch 15240/20000: Accuracy = 0.3750
Epoch 15241/20000: Accuracy = 0.3824
Epoch 15242/20000: Accuracy = 0.4485
Epoch 15243/20000: Accuracy = 0.3971
Epoch 15244/20000: Accuracy = 0.6176
Epoch 15245/20000: Accuracy = 0.6176
Epoch 15246/20000: Accuracy = 0.4485
Epoch 15247/20000: Accuracy = 0.3676
Epoch 15248/20000: Accuracy = 0.6397
Epoch 15249/20000: Accuracy = 0.5882
Epoch 15250/20000: Accuracy = 0.5368
Epoch 15251/20000: Accuracy = 0.6176
Epoch 15252/20000: Accuracy = 0.3750
Epoch 15253/20000: Accuracy = 0.3750
Epoch 15254/20000: Accuracy = 0.4926
Epoch 15255/20000: Accuracy = 0.6250
Epoch 15256/20000: Accuracy = 0.5882
Epoch 15257/20000: Accuracy = 0.6103
Epoch 15258/20000: Accuracy = 0.6397
Epoch 15259/20000: Accuracy = 0.6029
Epoch 15260/20000: Accuracy = 0.3676
Epoch 15261/20000: Accuracy = 0.4118
Epoch 15262/20000: Accuracy = 0.5221
Epoch 15263/20000: Accuracy = 0.3897
Epoch 15264/20000: Accuracy = 0.3750
Epoch 15265/20000: Accuracy = 0.6176
Epoch 15266/20000: Accuracy = 0.3676
Epoch 15267/20000: Accuracy = 0.5441
Epoch 15268/20000: Accuracy = 0.6471
Epoch 15269/20000: Accuracy = 0.6250
Epoch 15270/20000: Accuracy = 0.5515
Epoch 15271/20000: Accuracy = 0.3750
Epoch 15272/20000: Accuracy = 0.3971
```

```
Epoch 15273/20000: Accuracy = 0.3750
Epoch 15274/20000: Accuracy = 0.3824
Epoch 15275/20000: Accuracy = 0.6103
Epoch 15276/20000: Accuracy = 0.5882
Epoch 15277/20000: Accuracy = 0.3162
Epoch 15278/20000: Accuracy = 0.6176
Epoch 15279/20000: Accuracy = 0.5956
Epoch 15280/20000: Accuracy = 0.3603
Epoch 15281/20000: Accuracy = 0.6324
Epoch 15282/20000: Accuracy = 0.5809
Epoch 15283/20000: Accuracy = 0.4632
Epoch 15284/20000: Accuracy = 0.6176
Epoch 15285/20000: Accuracy = 0.6029
Epoch 15286/20000: Accuracy = 0.3676
Epoch 15287/20000: Accuracy = 0.3750
Epoch 15288/20000: Accuracy = 0.5147
Epoch 15289/20000: Accuracy = 0.3971
Epoch 15290/20000: Accuracy = 0.3824
Epoch 15291/20000: Accuracy = 0.3750
Epoch 15292/20000: Accuracy = 0.6838
Epoch 15293/20000: Accuracy = 0.6103
Epoch 15294/20000: Accuracy = 0.3824
Epoch 15295/20000: Accuracy = 0.3897
Epoch 15296/20000: Accuracy = 0.6103
Epoch 15297/20000: Accuracy = 0.6176
Epoch 15298/20000: Accuracy = 0.3750
Epoch 15299/20000: Accuracy = 0.5882
Epoch 15300/20000: Accuracy = 0.3971
Epoch 15301/20000: Accuracy = 0.3824
Epoch 15302/20000: Accuracy = 0.5368
Epoch 15303/20000: Accuracy = 0.5809
Epoch 15304/20000: Accuracy = 0.3971
Epoch 15305/20000: Accuracy = 0.5368
Epoch 15306/20000: Accuracy = 0.6176
Epoch 15307/20000: Accuracy = 0.5735
Epoch 15308/20000: Accuracy = 0.3456
Epoch 15309/20000: Accuracy = 0.5588
Epoch 15310/20000: Accuracy = 0.4412
Epoch 15311/20000: Accuracy = 0.4191
Epoch 15312/20000: Accuracy = 0.5662
Epoch 15313/20000: Accuracy = 0.4706
Epoch 15314/20000: Accuracy = 0.5882
Epoch 15315/20000: Accuracy = 0.3750
Epoch 15316/20000: Accuracy = 0.6250
Epoch 15317/20000: Accuracy = 0.3824
Epoch 15318/20000: Accuracy = 0.5515
Epoch 15319/20000: Accuracy = 0.6250
Epoch 15320/20000: Accuracy = 0.6103
```

```
Epoch 15321/20000: Accuracy = 0.3750
Epoch 15322/20000: Accuracy = 0.4118
Epoch 15323/20000: Accuracy = 0.5515
Epoch 15324/20000: Accuracy = 0.3971
Epoch 15325/20000: Accuracy = 0.6176
Epoch 15326/20000: Accuracy = 0.3897
Epoch 15327/20000: Accuracy = 0.3897
Epoch 15328/20000: Accuracy = 0.4412
Epoch 15329/20000: Accuracy = 0.5956
Epoch 15330/20000: Accuracy = 0.3897
Epoch 15331/20000: Accuracy = 0.5147
Epoch 15332/20000: Accuracy = 0.6250
Epoch 15333/20000: Accuracy = 0.6250
Epoch 15334/20000: Accuracy = 0.3529
Epoch 15335/20000: Accuracy = 0.3603
Epoch 15336/20000: Accuracy = 0.3824
Epoch 15337/20000: Accuracy = 0.6250
Epoch 15338/20000: Accuracy = 0.6176
Epoch 15339/20000: Accuracy = 0.4265
Epoch 15340/20000: Accuracy = 0.5588
Epoch 15341/20000: Accuracy = 0.3824
Epoch 15342/20000: Accuracy = 0.6103
Epoch 15343/20000: Accuracy = 0.5074
Epoch 15344/20000: Accuracy = 0.5882
Epoch 15345/20000: Accuracy = 0.3235
Epoch 15346/20000: Accuracy = 0.4559
Epoch 15347/20000: Accuracy = 0.4632
Epoch 15348/20000: Accuracy = 0.3309
Epoch 15349/20000: Accuracy = 0.5882
Epoch 15350/20000: Accuracy = 0.6176
Epoch 15351/20000: Accuracy = 0.3750
Epoch 15352/20000: Accuracy = 0.3456
Epoch 15353/20000: Accuracy = 0.3750
Epoch 15354/20000: Accuracy = 0.6912
Epoch 15355/20000: Accuracy = 0.3897
Epoch 15356/20000: Accuracy = 0.6176
Epoch 15357/20000: Accuracy = 0.3088
Epoch 15358/20000: Accuracy = 0.6176
Epoch 15359/20000: Accuracy = 0.6103
Epoch 15360/20000: Accuracy = 0.3971
Epoch 15361/20000: Accuracy = 0.4559
Epoch 15362/20000: Accuracy = 0.6544
Epoch 15363/20000: Accuracy = 0.3971
Epoch 15364/20000: Accuracy = 0.6176
Epoch 15365/20000: Accuracy = 0.6250
Epoch 15366/20000: Accuracy = 0.3897
Epoch 15367/20000: Accuracy = 0.6029
Epoch 15368/20000: Accuracy = 0.4118
```

```
Epoch 15369/20000: Accuracy = 0.6250
Epoch 15370/20000: Accuracy = 0.5294
Epoch 15371/20000: Accuracy = 0.3750
Epoch 15372/20000: Accuracy = 0.6250
Epoch 15373/20000: Accuracy = 0.4191
Epoch 15374/20000: Accuracy = 0.6176
Epoch 15375/20000: Accuracy = 0.6250
Epoch 15376/20000: Accuracy = 0.4191
Epoch 15377/20000: Accuracy = 0.3750
Epoch 15378/20000: Accuracy = 0.3750
Epoch 15379/20000: Accuracy = 0.3529
Epoch 15380/20000: Accuracy = 0.6250
Epoch 15381/20000: Accuracy = 0.5221
Epoch 15382/20000: Accuracy = 0.3603
Epoch 15383/20000: Accuracy = 0.3750
Epoch 15384/20000: Accuracy = 0.5221
Epoch 15385/20000: Accuracy = 0.6250
Epoch 15386/20000: Accuracy = 0.5882
Epoch 15387/20000: Accuracy = 0.5441
Epoch 15388/20000: Accuracy = 0.4265
Epoch 15389/20000: Accuracy = 0.6029
Epoch 15390/20000: Accuracy = 0.4338
Epoch 15391/20000: Accuracy = 0.7059
Epoch 15392/20000: Accuracy = 0.6471
Epoch 15393/20000: Accuracy = 0.6103
Epoch 15394/20000: Accuracy = 0.4265
Epoch 15395/20000: Accuracy = 0.3897
Epoch 15396/20000: Accuracy = 0.6324
Epoch 15397/20000: Accuracy = 0.4265
Epoch 15398/20000: Accuracy = 0.5735
Epoch 15399/20000: Accuracy = 0.3750
Epoch 15400/20000: Accuracy = 0.6176
Epoch 15401/20000: Accuracy = 0.5956
Epoch 15402/20000: Accuracy = 0.4779
Epoch 15403/20000: Accuracy = 0.3824
Epoch 15404/20000: Accuracy = 0.4265
Epoch 15405/20000: Accuracy = 0.6103
Epoch 15406/20000: Accuracy = 0.4118
Epoch 15407/20000: Accuracy = 0.4779
Epoch 15408/20000: Accuracy = 0.4265
Epoch 15409/20000: Accuracy = 0.5882
Epoch 15410/20000: Accuracy = 0.3824
Epoch 15411/20000: Accuracy = 0.4044
Epoch 15412/20000: Accuracy = 0.5956
Epoch 15413/20000: Accuracy = 0.6765
Epoch 15414/20000: Accuracy = 0.5588
Epoch 15415/20000: Accuracy = 0.4044
Epoch 15416/20000: Accuracy = 0.3750
```

```
Epoch 15417/20000: Accuracy = 0.4926
Epoch 15418/20000: Accuracy = 0.4118
Epoch 15419/20000: Accuracy = 0.6985
Epoch 15420/20000: Accuracy = 0.6544
Epoch 15421/20000: Accuracy = 0.3971
Epoch 15422/20000: Accuracy = 0.6397
Epoch 15423/20000: Accuracy = 0.6250
Epoch 15424/20000: Accuracy = 0.3603
Epoch 15425/20000: Accuracy = 0.5147
Epoch 15426/20000: Accuracy = 0.6103
Epoch 15427/20000: Accuracy = 0.6324
Epoch 15428/20000: Accuracy = 0.5956
Epoch 15429/20000: Accuracy = 0.6618
Epoch 15430/20000: Accuracy = 0.6176
Epoch 15431/20000: Accuracy = 0.5956
Epoch 15432/20000: Accuracy = 0.5735
Epoch 15433/20000: Accuracy = 0.6250
Epoch 15434/20000: Accuracy = 0.5882
Epoch 15435/20000: Accuracy = 0.4632
Epoch 15436/20000: Accuracy = 0.6250
Epoch 15437/20000: Accuracy = 0.3824
Epoch 15438/20000: Accuracy = 0.6471
Epoch 15439/20000: Accuracy = 0.6250
Epoch 15440/20000: Accuracy = 0.6397
Epoch 15441/20000: Accuracy = 0.6176
Epoch 15442/20000: Accuracy = 0.4265
Epoch 15443/20000: Accuracy = 0.3824
Epoch 15444/20000: Accuracy = 0.6471
Epoch 15445/20000: Accuracy = 0.6029
Epoch 15446/20000: Accuracy = 0.4779
Epoch 15447/20000: Accuracy = 0.6029
Epoch 15448/20000: Accuracy = 0.6029
Epoch 15449/20000: Accuracy = 0.3750
Epoch 15450/20000: Accuracy = 0.3897
Epoch 15451/20000: Accuracy = 0.5809
Epoch 15452/20000: Accuracy = 0.5956
Epoch 15453/20000: Accuracy = 0.3235
Epoch 15454/20000: Accuracy = 0.3750
Epoch 15455/20000: Accuracy = 0.4706
Epoch 15456/20000: Accuracy = 0.5809
Epoch 15457/20000: Accuracy = 0.4412
Epoch 15458/20000: Accuracy = 0.4191
Epoch 15459/20000: Accuracy = 0.3824
Epoch 15460/20000: Accuracy = 0.5809
Epoch 15461/20000: Accuracy = 0.6765
Epoch 15462/20000: Accuracy = 0.4926
Epoch 15463/20000: Accuracy = 0.6103
Epoch 15464/20000: Accuracy = 0.3382
```

```
Epoch 15465/20000: Accuracy = 0.3824
Epoch 15466/20000: Accuracy = 0.3897
Epoch 15467/20000: Accuracy = 0.6324
Epoch 15468/20000: Accuracy = 0.3750
Epoch 15469/20000: Accuracy = 0.6250
Epoch 15470/20000: Accuracy = 0.3750
Epoch 15471/20000: Accuracy = 0.3750
Epoch 15472/20000: Accuracy = 0.5515
Epoch 15473/20000: Accuracy = 0.6176
Epoch 15474/20000: Accuracy = 0.3750
Epoch 15475/20000: Accuracy = 0.5809
Epoch 15476/20000: Accuracy = 0.6176
Epoch 15477/20000: Accuracy = 0.5515
Epoch 15478/20000: Accuracy = 0.3750
Epoch 15479/20000: Accuracy = 0.3750
Epoch 15480/20000: Accuracy = 0.4632
Epoch 15481/20000: Accuracy = 0.6250
Epoch 15482/20000: Accuracy = 0.4265
Epoch 15483/20000: Accuracy = 0.6397
Epoch 15484/20000: Accuracy = 0.3750
Epoch 15485/20000: Accuracy = 0.3676
Epoch 15486/20000: Accuracy = 0.4118
Epoch 15487/20000: Accuracy = 0.3015
Epoch 15488/20000: Accuracy = 0.3971
Epoch 15489/20000: Accuracy = 0.4485
Epoch 15490/20000: Accuracy = 0.3897
Epoch 15491/20000: Accuracy = 0.3971
Epoch 15492/20000: Accuracy = 0.4338
Epoch 15493/20000: Accuracy = 0.6176
Epoch 15494/20000: Accuracy = 0.3824
Epoch 15495/20000: Accuracy = 0.4265
Epoch 15496/20000: Accuracy = 0.4118
Epoch 15497/20000: Accuracy = 0.6176
Epoch 15498/20000: Accuracy = 0.6176
Epoch 15499/20000: Accuracy = 0.4853
Epoch 15500/20000: Accuracy = 0.3750
Epoch 15501/20000: Accuracy = 0.3897
Epoch 15502/20000: Accuracy = 0.3824
Epoch 15503/20000: Accuracy = 0.4044
Epoch 15504/20000: Accuracy = 0.5294
Epoch 15505/20000: Accuracy = 0.6250
Epoch 15506/20000: Accuracy = 0.6176
Epoch 15507/20000: Accuracy = 0.6103
Epoch 15508/20000: Accuracy = 0.3824
Epoch 15509/20000: Accuracy = 0.5294
Epoch 15510/20000: Accuracy = 0.6471
Epoch 15511/20000: Accuracy = 0.3750
Epoch 15512/20000: Accuracy = 0.6250
```

```
Epoch 15513/20000: Accuracy = 0.4044
Epoch 15514/20000: Accuracy = 0.6176
Epoch 15515/20000: Accuracy = 0.6250
Epoch 15516/20000: Accuracy = 0.6250
Epoch 15517/20000: Accuracy = 0.5882
Epoch 15518/20000: Accuracy = 0.3971
Epoch 15519/20000: Accuracy = 0.5882
Epoch 15520/20000: Accuracy = 0.5956
Epoch 15521/20000: Accuracy = 0.4779
Epoch 15522/20000: Accuracy = 0.6103
Epoch 15523/20000: Accuracy = 0.5809
Epoch 15524/20000: Accuracy = 0.7206
Epoch 15525/20000: Accuracy = 0.5147
Epoch 15526/20000: Accuracy = 0.6324
Epoch 15527/20000: Accuracy = 0.6250
Epoch 15528/20000: Accuracy = 0.7279
Epoch 15529/20000: Accuracy = 0.3750
Epoch 15530/20000: Accuracy = 0.3750
Epoch 15531/20000: Accuracy = 0.6029
Epoch 15532/20000: Accuracy = 0.5588
Epoch 15533/20000: Accuracy = 0.4485
Epoch 15534/20000: Accuracy = 0.6029
Epoch 15535/20000: Accuracy = 0.3824
Epoch 15536/20000: Accuracy = 0.5882
Epoch 15537/20000: Accuracy = 0.3897
Epoch 15538/20000: Accuracy = 0.5000
Epoch 15539/20000: Accuracy = 0.5294
Epoch 15540/20000: Accuracy = 0.6176
Epoch 15541/20000: Accuracy = 0.4338
Epoch 15542/20000: Accuracy = 0.3676
Epoch 15543/20000: Accuracy = 0.6397
Epoch 15544/20000: Accuracy = 0.6176
Epoch 15545/20000: Accuracy = 0.5882
Epoch 15546/20000: Accuracy = 0.3456
Epoch 15547/20000: Accuracy = 0.6324
Epoch 15548/20000: Accuracy = 0.3456
Epoch 15549/20000: Accuracy = 0.6103
Epoch 15550/20000: Accuracy = 0.6176
Epoch 15551/20000: Accuracy = 0.6250
Epoch 15552/20000: Accuracy = 0.4044
Epoch 15553/20000: Accuracy = 0.6176
Epoch 15554/20000: Accuracy = 0.4559
Epoch 15555/20000: Accuracy = 0.4706
Epoch 15556/20000: Accuracy = 0.5809
Epoch 15557/20000: Accuracy = 0.2721
Epoch 15558/20000: Accuracy = 0.3603
Epoch 15559/20000: Accuracy = 0.3750
Epoch 15560/20000: Accuracy = 0.6250
```

```
Epoch 15561/20000: Accuracy = 0.6397
Epoch 15562/20000: Accuracy = 0.4559
Epoch 15563/20000: Accuracy = 0.6103
Epoch 15564/20000: Accuracy = 0.6250
Epoch 15565/20000: Accuracy = 0.3456
Epoch 15566/20000: Accuracy = 0.6471
Epoch 15567/20000: Accuracy = 0.6176
Epoch 15568/20000: Accuracy = 0.6176
Epoch 15569/20000: Accuracy = 0.3750
Epoch 15570/20000: Accuracy = 0.4191
Epoch 15571/20000: Accuracy = 0.5515
Epoch 15572/20000: Accuracy = 0.6250
Epoch 15573/20000: Accuracy = 0.6029
Epoch 15574/20000: Accuracy = 0.6176
Epoch 15575/20000: Accuracy = 0.5000
Epoch 15576/20000: Accuracy = 0.3750
Epoch 15577/20000: Accuracy = 0.5441
Epoch 15578/20000: Accuracy = 0.3897
Epoch 15579/20000: Accuracy = 0.3897
Epoch 15580/20000: Accuracy = 0.3750
Epoch 15581/20000: Accuracy = 0.5662
Epoch 15582/20000: Accuracy = 0.5882
Epoch 15583/20000: Accuracy = 0.6029
Epoch 15584/20000: Accuracy = 0.3971
Epoch 15585/20000: Accuracy = 0.3824
Epoch 15586/20000: Accuracy = 0.6029
Epoch 15587/20000: Accuracy = 0.5515
Epoch 15588/20000: Accuracy = 0.6176
Epoch 15589/20000: Accuracy = 0.6029
Epoch 15590/20000: Accuracy = 0.3750
Epoch 15591/20000: Accuracy = 0.6029
Epoch 15592/20000: Accuracy = 0.6103
Epoch 15593/20000: Accuracy = 0.6176
Epoch 15594/20000: Accuracy = 0.6250
Epoch 15595/20000: Accuracy = 0.4044
Epoch 15596/20000: Accuracy = 0.6250
Epoch 15597/20000: Accuracy = 0.3750
Epoch 15598/20000: Accuracy = 0.6103
Epoch 15599/20000: Accuracy = 0.3750
Epoch 15600/20000: Accuracy = 0.6765
Epoch 15601/20000: Accuracy = 0.4706
Epoch 15602/20000: Accuracy = 0.4412
Epoch 15603/20000: Accuracy = 0.4118
Epoch 15604/20000: Accuracy = 0.3971
Epoch 15605/20000: Accuracy = 0.3676
Epoch 15606/20000: Accuracy = 0.6103
Epoch 15607/20000: Accuracy = 0.6029
Epoch 15608/20000: Accuracy = 0.3971
```

```
Epoch 15609/20000: Accuracy = 0.5956
Epoch 15610/20000: Accuracy = 0.6691
Epoch 15611/20000: Accuracy = 0.5368
Epoch 15612/20000: Accuracy = 0.3750
Epoch 15613/20000: Accuracy = 0.6324
Epoch 15614/20000: Accuracy = 0.6250
Epoch 15615/20000: Accuracy = 0.3750
Epoch 15616/20000: Accuracy = 0.3676
Epoch 15617/20000: Accuracy = 0.4632
Epoch 15618/20000: Accuracy = 0.4559
Epoch 15619/20000: Accuracy = 0.6176
Epoch 15620/20000: Accuracy = 0.4191
Epoch 15621/20000: Accuracy = 0.6103
Epoch 15622/20000: Accuracy = 0.3897
Epoch 15623/20000: Accuracy = 0.4265
Epoch 15624/20000: Accuracy = 0.4118
Epoch 15625/20000: Accuracy = 0.6250
Epoch 15626/20000: Accuracy = 0.5662
Epoch 15627/20000: Accuracy = 0.4265
Epoch 15628/20000: Accuracy = 0.4118
Epoch 15629/20000: Accuracy = 0.3750
Epoch 15630/20000: Accuracy = 0.3824
Epoch 15631/20000: Accuracy = 0.3750
Epoch 15632/20000: Accuracy = 0.6029
Epoch 15633/20000: Accuracy = 0.3824
Epoch 15634/20000: Accuracy = 0.6103
Epoch 15635/20000: Accuracy = 0.4706
Epoch 15636/20000: Accuracy = 0.6176
Epoch 15637/20000: Accuracy = 0.3750
Epoch 15638/20000: Accuracy = 0.3897
Epoch 15639/20000: Accuracy = 0.4191
Epoch 15640/20000: Accuracy = 0.7059
Epoch 15641/20000: Accuracy = 0.3162
Epoch 15642/20000: Accuracy = 0.3750
Epoch 15643/20000: Accuracy = 0.5588
Epoch 15644/20000: Accuracy = 0.7059
Epoch 15645/20000: Accuracy = 0.6176
Epoch 15646/20000: Accuracy = 0.3824
Epoch 15647/20000: Accuracy = 0.6176
Epoch 15648/20000: Accuracy = 0.3750
Epoch 15649/20000: Accuracy = 0.6103
Epoch 15650/20000: Accuracy = 0.5000
Epoch 15651/20000: Accuracy = 0.6029
Epoch 15652/20000: Accuracy = 0.4265
Epoch 15653/20000: Accuracy = 0.5882
Epoch 15654/20000: Accuracy = 0.3824
Epoch 15655/20000: Accuracy = 0.3750
Epoch 15656/20000: Accuracy = 0.4191
```

```
Epoch 15657/20000: Accuracy = 0.6176
Epoch 15658/20000: Accuracy = 0.3824
Epoch 15659/20000: Accuracy = 0.5809
Epoch 15660/20000: Accuracy = 0.6471
Epoch 15661/20000: Accuracy = 0.3603
Epoch 15662/20000: Accuracy = 0.5956
Epoch 15663/20000: Accuracy = 0.6250
Epoch 15664/20000: Accuracy = 0.6544
Epoch 15665/20000: Accuracy = 0.3750
Epoch 15666/20000: Accuracy = 0.4118
Epoch 15667/20000: Accuracy = 0.4265
Epoch 15668/20000: Accuracy = 0.5588
Epoch 15669/20000: Accuracy = 0.6176
Epoch 15670/20000: Accuracy = 0.5735
Epoch 15671/20000: Accuracy = 0.6029
Epoch 15672/20000: Accuracy = 0.5956
Epoch 15673/20000: Accuracy = 0.5441
Epoch 15674/20000: Accuracy = 0.3750
Epoch 15675/20000: Accuracy = 0.6176
Epoch 15676/20000: Accuracy = 0.4632
Epoch 15677/20000: Accuracy = 0.6397
Epoch 15678/20000: Accuracy = 0.6250
Epoch 15679/20000: Accuracy = 0.3824
Epoch 15680/20000: Accuracy = 0.6324
Epoch 15681/20000: Accuracy = 0.6250
Epoch 15682/20000: Accuracy = 0.3824
Epoch 15683/20000: Accuracy = 0.3971
Epoch 15684/20000: Accuracy = 0.6250
Epoch 15685/20000: Accuracy = 0.3750
Epoch 15686/20000: Accuracy = 0.4338
Epoch 15687/20000: Accuracy = 0.6176
Epoch 15688/20000: Accuracy = 0.3824
Epoch 15689/20000: Accuracy = 0.3750
Epoch 15690/20000: Accuracy = 0.5074
Epoch 15691/20000: Accuracy = 0.6250
Epoch 15692/20000: Accuracy = 0.6103
Epoch 15693/20000: Accuracy = 0.4559
Epoch 15694/20000: Accuracy = 0.6544
Epoch 15695/20000: Accuracy = 0.4706
Epoch 15696/20000: Accuracy = 0.3750
Epoch 15697/20000: Accuracy = 0.5074
Epoch 15698/20000: Accuracy = 0.6103
Epoch 15699/20000: Accuracy = 0.3824
Epoch 15700/20000: Accuracy = 0.4265
Epoch 15701/20000: Accuracy = 0.3750
Epoch 15702/20000: Accuracy = 0.6103
Epoch 15703/20000: Accuracy = 0.6250
Epoch 15704/20000: Accuracy = 0.5882
```

```
Epoch 15705/20000: Accuracy = 0.3603
Epoch 15706/20000: Accuracy = 0.3750
Epoch 15707/20000: Accuracy = 0.4044
Epoch 15708/20000: Accuracy = 0.3529
Epoch 15709/20000: Accuracy = 0.6250
Epoch 15710/20000: Accuracy = 0.4044
Epoch 15711/20000: Accuracy = 0.3676
Epoch 15712/20000: Accuracy = 0.6103
Epoch 15713/20000: Accuracy = 0.6176
Epoch 15714/20000: Accuracy = 0.3015
Epoch 15715/20000: Accuracy = 0.6250
Epoch 15716/20000: Accuracy = 0.3897
Epoch 15717/20000: Accuracy = 0.6691
Epoch 15718/20000: Accuracy = 0.3750
Epoch 15719/20000: Accuracy = 0.6250
Epoch 15720/20000: Accuracy = 0.6176
Epoch 15721/20000: Accuracy = 0.4118
Epoch 15722/20000: Accuracy = 0.6176
Epoch 15723/20000: Accuracy = 0.4485
Epoch 15724/20000: Accuracy = 0.4412
Epoch 15725/20000: Accuracy = 0.5662
Epoch 15726/20000: Accuracy = 0.4559
Epoch 15727/20000: Accuracy = 0.3824
Epoch 15728/20000: Accuracy = 0.6029
Epoch 15729/20000: Accuracy = 0.4118
Epoch 15730/20000: Accuracy = 0.6103
Epoch 15731/20000: Accuracy = 0.3971
Epoch 15732/20000: Accuracy = 0.6250
Epoch 15733/20000: Accuracy = 0.6029
Epoch 15734/20000: Accuracy = 0.5221
Epoch 15735/20000: Accuracy = 0.3750
Epoch 15736/20000: Accuracy = 0.6250
Epoch 15737/20000: Accuracy = 0.6250
Epoch 15738/20000: Accuracy = 0.4412
Epoch 15739/20000: Accuracy = 0.5588
Epoch 15740/20000: Accuracy = 0.3750
Epoch 15741/20000: Accuracy = 0.3750
Epoch 15742/20000: Accuracy = 0.5809
Epoch 15743/20000: Accuracy = 0.6176
Epoch 15744/20000: Accuracy = 0.3971
Epoch 15745/20000: Accuracy = 0.3750
Epoch 15746/20000: Accuracy = 0.4779
Epoch 15747/20000: Accuracy = 0.5074
Epoch 15748/20000: Accuracy = 0.3897
Epoch 15749/20000: Accuracy = 0.4118
Epoch 15750/20000: Accuracy = 0.4044
Epoch 15751/20000: Accuracy = 0.4706
Epoch 15752/20000: Accuracy = 0.5147
```

```
Epoch 15753/20000: Accuracy = 0.6471
Epoch 15754/20000: Accuracy = 0.6324
Epoch 15755/20000: Accuracy = 0.3824
Epoch 15756/20000: Accuracy = 0.3676
Epoch 15757/20000: Accuracy = 0.2574
Epoch 15758/20000: Accuracy = 0.6250
Epoch 15759/20000: Accuracy = 0.3824
Epoch 15760/20000: Accuracy = 0.4632
Epoch 15761/20000: Accuracy = 0.3824
Epoch 15762/20000: Accuracy = 0.4853
Epoch 15763/20000: Accuracy = 0.4926
Epoch 15764/20000: Accuracy = 0.6250
Epoch 15765/20000: Accuracy = 0.6176
Epoch 15766/20000: Accuracy = 0.6250
Epoch 15767/20000: Accuracy = 0.6250
Epoch 15768/20000: Accuracy = 0.3750
Epoch 15769/20000: Accuracy = 0.6250
Epoch 15770/20000: Accuracy = 0.3750
Epoch 15771/20000: Accuracy = 0.6250
Epoch 15772/20000: Accuracy = 0.5956
Epoch 15773/20000: Accuracy = 0.6250
Epoch 15774/20000: Accuracy = 0.3162
Epoch 15775/20000: Accuracy = 0.6250
Epoch 15776/20000: Accuracy = 0.2941
Epoch 15777/20000: Accuracy = 0.4118
Epoch 15778/20000: Accuracy = 0.4853
Epoch 15779/20000: Accuracy = 0.4706
Epoch 15780/20000: Accuracy = 0.6103
Epoch 15781/20000: Accuracy = 0.3750
Epoch 15782/20000: Accuracy = 0.3750
Epoch 15783/20000: Accuracy = 0.3750
Epoch 15784/20000: Accuracy = 0.3750
Epoch 15785/20000: Accuracy = 0.6324
Epoch 15786/20000: Accuracy = 0.5956
Epoch 15787/20000: Accuracy = 0.3162
Epoch 15788/20000: Accuracy = 0.5735
Epoch 15789/20000: Accuracy = 0.6103
Epoch 15790/20000: Accuracy = 0.3824
Epoch 15791/20000: Accuracy = 0.3456
Epoch 15792/20000: Accuracy = 0.6765
Epoch 15793/20000: Accuracy = 0.6103
Epoch 15794/20000: Accuracy = 0.3750
Epoch 15795/20000: Accuracy = 0.5956
Epoch 15796/20000: Accuracy = 0.3897
Epoch 15797/20000: Accuracy = 0.3750
Epoch 15798/20000: Accuracy = 0.5662
Epoch 15799/20000: Accuracy = 0.6250
Epoch 15800/20000: Accuracy = 0.6103
```

```
Epoch 15801/20000: Accuracy = 0.5809
Epoch 15802/20000: Accuracy = 0.3824
Epoch 15803/20000: Accuracy = 0.3456
Epoch 15804/20000: Accuracy = 0.4412
Epoch 15805/20000: Accuracy = 0.5588
Epoch 15806/20000: Accuracy = 0.6250
Epoch 15807/20000: Accuracy = 0.5221
Epoch 15808/20000: Accuracy = 0.3824
Epoch 15809/20000: Accuracy = 0.6103
Epoch 15810/20000: Accuracy = 0.3971
Epoch 15811/20000: Accuracy = 0.5809
Epoch 15812/20000: Accuracy = 0.6324
Epoch 15813/20000: Accuracy = 0.6250
Epoch 15814/20000: Accuracy = 0.6250
Epoch 15815/20000: Accuracy = 0.3603
Epoch 15816/20000: Accuracy = 0.6324
Epoch 15817/20000: Accuracy = 0.3382
Epoch 15818/20000: Accuracy = 0.3529
Epoch 15819/20000: Accuracy = 0.3750
Epoch 15820/20000: Accuracy = 0.6250
Epoch 15821/20000: Accuracy = 0.4265
Epoch 15822/20000: Accuracy = 0.3824
Epoch 15823/20000: Accuracy = 0.6176
Epoch 15824/20000: Accuracy = 0.4044
Epoch 15825/20000: Accuracy = 0.4485
Epoch 15826/20000: Accuracy = 0.3897
Epoch 15827/20000: Accuracy = 0.6912
Epoch 15828/20000: Accuracy = 0.3824
Epoch 15829/20000: Accuracy = 0.6176
Epoch 15830/20000: Accuracy = 0.6250
Epoch 15831/20000: Accuracy = 0.6176
Epoch 15832/20000: Accuracy = 0.6250
Epoch 15833/20000: Accuracy = 0.4191
Epoch 15834/20000: Accuracy = 0.6471
Epoch 15835/20000: Accuracy = 0.3971
Epoch 15836/20000: Accuracy = 0.3824
Epoch 15837/20000: Accuracy = 0.5956
Epoch 15838/20000: Accuracy = 0.6324
Epoch 15839/20000: Accuracy = 0.4338
Epoch 15840/20000: Accuracy = 0.5221
Epoch 15841/20000: Accuracy = 0.6103
Epoch 15842/20000: Accuracy = 0.6103
Epoch 15843/20000: Accuracy = 0.6471
Epoch 15844/20000: Accuracy = 0.4779
Epoch 15845/20000: Accuracy = 0.6176
Epoch 15846/20000: Accuracy = 0.4191
Epoch 15847/20000: Accuracy = 0.5515
Epoch 15848/20000: Accuracy = 0.3603
```

```
Epoch 15849/20000: Accuracy = 0.6250
Epoch 15850/20000: Accuracy = 0.3824
Epoch 15851/20000: Accuracy = 0.6250
Epoch 15852/20000: Accuracy = 0.3750
Epoch 15853/20000: Accuracy = 0.6029
Epoch 15854/20000: Accuracy = 0.3897
Epoch 15855/20000: Accuracy = 0.6103
Epoch 15856/20000: Accuracy = 0.3676
Epoch 15857/20000: Accuracy = 0.6103
Epoch 15858/20000: Accuracy = 0.3750
Epoch 15859/20000: Accuracy = 0.4779
Epoch 15860/20000: Accuracy = 0.4118
Epoch 15861/20000: Accuracy = 0.4853
Epoch 15862/20000: Accuracy = 0.6103
Epoch 15863/20000: Accuracy = 0.5956
Epoch 15864/20000: Accuracy = 0.5882
Epoch 15865/20000: Accuracy = 0.6029
Epoch 15866/20000: Accuracy = 0.3750
Epoch 15867/20000: Accuracy = 0.4265
Epoch 15868/20000: Accuracy = 0.5221
Epoch 15869/20000: Accuracy = 0.5368
Epoch 15870/20000: Accuracy = 0.3897
Epoch 15871/20000: Accuracy = 0.3897
Epoch 15872/20000: Accuracy = 0.6103
Epoch 15873/20000: Accuracy = 0.4779
Epoch 15874/20000: Accuracy = 0.3824
Epoch 15875/20000: Accuracy = 0.3824
Epoch 15876/20000: Accuracy = 0.4265
Epoch 15877/20000: Accuracy = 0.4338
Epoch 15878/20000: Accuracy = 0.3750
Epoch 15879/20000: Accuracy = 0.6103
Epoch 15880/20000: Accuracy = 0.6544
Epoch 15881/20000: Accuracy = 0.6250
Epoch 15882/20000: Accuracy = 0.4485
Epoch 15883/20000: Accuracy = 0.3824
Epoch 15884/20000: Accuracy = 0.5809
Epoch 15885/20000: Accuracy = 0.4191
Epoch 15886/20000: Accuracy = 0.6176
Epoch 15887/20000: Accuracy = 0.6103
Epoch 15888/20000: Accuracy = 0.6176
Epoch 15889/20000: Accuracy = 0.6103
Epoch 15890/20000: Accuracy = 0.6471
Epoch 15891/20000: Accuracy = 0.3824
Epoch 15892/20000: Accuracy = 0.4412
Epoch 15893/20000: Accuracy = 0.3676
Epoch 15894/20000: Accuracy = 0.6029
Epoch 15895/20000: Accuracy = 0.6250
Epoch 15896/20000: Accuracy = 0.2868
```

```
Epoch 15897/20000: Accuracy = 0.4265
Epoch 15898/20000: Accuracy = 0.6103
Epoch 15899/20000: Accuracy = 0.3897
Epoch 15900/20000: Accuracy = 0.3750
Epoch 15901/20000: Accuracy = 0.6618
Epoch 15902/20000: Accuracy = 0.5294
Epoch 15903/20000: Accuracy = 0.6618
Epoch 15904/20000: Accuracy = 0.4118
Epoch 15905/20000: Accuracy = 0.6103
Epoch 15906/20000: Accuracy = 0.3824
Epoch 15907/20000: Accuracy = 0.6176
Epoch 15908/20000: Accuracy = 0.5588
Epoch 15909/20000: Accuracy = 0.5882
Epoch 15910/20000: Accuracy = 0.6691
Epoch 15911/20000: Accuracy = 0.6250
Epoch 15912/20000: Accuracy = 0.5882
Epoch 15913/20000: Accuracy = 0.6324
Epoch 15914/20000: Accuracy = 0.3824
Epoch 15915/20000: Accuracy = 0.4118
Epoch 15916/20000: Accuracy = 0.3162
Epoch 15917/20000: Accuracy = 0.6250
Epoch 15918/20000: Accuracy = 0.3750
Epoch 15919/20000: Accuracy = 0.4779
Epoch 15920/20000: Accuracy = 0.3750
Epoch 15921/20000: Accuracy = 0.6250
Epoch 15922/20000: Accuracy = 0.5441
Epoch 15923/20000: Accuracy = 0.6250
Epoch 15924/20000: Accuracy = 0.4191
Epoch 15925/20000: Accuracy = 0.3750
Epoch 15926/20000: Accuracy = 0.3750
Epoch 15927/20000: Accuracy = 0.3971
Epoch 15928/20000: Accuracy = 0.6103
Epoch 15929/20000: Accuracy = 0.5221
Epoch 15930/20000: Accuracy = 0.3824
Epoch 15931/20000: Accuracy = 0.6103
Epoch 15932/20000: Accuracy = 0.6691
Epoch 15933/20000: Accuracy = 0.6176
Epoch 15934/20000: Accuracy = 0.3824
Epoch 15935/20000: Accuracy = 0.3750
Epoch 15936/20000: Accuracy = 0.3676
Epoch 15937/20000: Accuracy = 0.5882
Epoch 15938/20000: Accuracy = 0.3897
Epoch 15939/20000: Accuracy = 0.5441
Epoch 15940/20000: Accuracy = 0.3897
Epoch 15941/20000: Accuracy = 0.3750
Epoch 15942/20000: Accuracy = 0.4265
Epoch 15943/20000: Accuracy = 0.6176
Epoch 15944/20000: Accuracy = 0.3750
```

```
Epoch 15945/20000: Accuracy = 0.4191
Epoch 15946/20000: Accuracy = 0.5074
Epoch 15947/20000: Accuracy = 0.4044
Epoch 15948/20000: Accuracy = 0.5956
Epoch 15949/20000: Accuracy = 0.3750
Epoch 15950/20000: Accuracy = 0.5515
Epoch 15951/20000: Accuracy = 0.3750
Epoch 15952/20000: Accuracy = 0.5662
Epoch 15953/20000: Accuracy = 0.3750
Epoch 15954/20000: Accuracy = 0.4044
Epoch 15955/20000: Accuracy = 0.6324
Epoch 15956/20000: Accuracy = 0.6544
Epoch 15957/20000: Accuracy = 0.6176
Epoch 15958/20000: Accuracy = 0.4485
Epoch 15959/20000: Accuracy = 0.5809
Epoch 15960/20000: Accuracy = 0.5441
Epoch 15961/20000: Accuracy = 0.5368
Epoch 15962/20000: Accuracy = 0.5956
Epoch 15963/20000: Accuracy = 0.3824
Epoch 15964/20000: Accuracy = 0.3750
Epoch 15965/20000: Accuracy = 0.6397
Epoch 15966/20000: Accuracy = 0.7059
Epoch 15967/20000: Accuracy = 0.3750
Epoch 15968/20000: Accuracy = 0.4706
Epoch 15969/20000: Accuracy = 0.3971
Epoch 15970/20000: Accuracy = 0.6250
Epoch 15971/20000: Accuracy = 0.4118
Epoch 15972/20000: Accuracy = 0.4044
Epoch 15973/20000: Accuracy = 0.5441
Epoch 15974/20000: Accuracy = 0.6397
Epoch 15975/20000: Accuracy = 0.6397
Epoch 15976/20000: Accuracy = 0.3824
Epoch 15977/20000: Accuracy = 0.6250
Epoch 15978/20000: Accuracy = 0.3750
Epoch 15979/20000: Accuracy = 0.6103
Epoch 15980/20000: Accuracy = 0.6838
Epoch 15981/20000: Accuracy = 0.5515
Epoch 15982/20000: Accuracy = 0.6250
Epoch 15983/20000: Accuracy = 0.3824
Epoch 15984/20000: Accuracy = 0.5074
Epoch 15985/20000: Accuracy = 0.5882
Epoch 15986/20000: Accuracy = 0.3897
Epoch 15987/20000: Accuracy = 0.6324
Epoch 15988/20000: Accuracy = 0.4265
Epoch 15989/20000: Accuracy = 0.3750
Epoch 15990/20000: Accuracy = 0.3750
Epoch 15991/20000: Accuracy = 0.6471
Epoch 15992/20000: Accuracy = 0.6103
```

```
Epoch 15993/20000: Accuracy = 0.6250
Epoch 15994/20000: Accuracy = 0.6250
Epoch 15995/20000: Accuracy = 0.5882
Epoch 15996/20000: Accuracy = 0.4118
Epoch 15997/20000: Accuracy = 0.6250
Epoch 15998/20000: Accuracy = 0.6176
Epoch 15999/20000: Accuracy = 0.3750
Epoch 16000/20000: Accuracy = 0.6176
Epoch 16001/20000: Accuracy = 0.6029
Epoch 16002/20000: Accuracy = 0.6397
Epoch 16003/20000: Accuracy = 0.6176
Epoch 16004/20000: Accuracy = 0.6618
Epoch 16005/20000: Accuracy = 0.6103
Epoch 16006/20000: Accuracy = 0.5221
Epoch 16007/20000: Accuracy = 0.6103
Epoch 16008/20000: Accuracy = 0.3824
Epoch 16009/20000: Accuracy = 0.3456
Epoch 16010/20000: Accuracy = 0.6250
Epoch 16011/20000: Accuracy = 0.3750
Epoch 16012/20000: Accuracy = 0.4044
Epoch 16013/20000: Accuracy = 0.3750
Epoch 16014/20000: Accuracy = 0.4265
Epoch 16015/20000: Accuracy = 0.6029
Epoch 16016/20000: Accuracy = 0.6103
Epoch 16017/20000: Accuracy = 0.4412
Epoch 16018/20000: Accuracy = 0.4926
Epoch 16019/20000: Accuracy = 0.6103
Epoch 16020/20000: Accuracy = 0.4044
Epoch 16021/20000: Accuracy = 0.5294
Epoch 16022/20000: Accuracy = 0.6176
Epoch 16023/20000: Accuracy = 0.5882
Epoch 16024/20000: Accuracy = 0.3971
Epoch 16025/20000: Accuracy = 0.5662
Epoch 16026/20000: Accuracy = 0.5735
Epoch 16027/20000: Accuracy = 0.3824
Epoch 16028/20000: Accuracy = 0.5956
Epoch 16029/20000: Accuracy = 0.6324
Epoch 16030/20000: Accuracy = 0.5882
Epoch 16031/20000: Accuracy = 0.5809
Epoch 16032/20000: Accuracy = 0.5662
Epoch 16033/20000: Accuracy = 0.5956
Epoch 16034/20000: Accuracy = 0.6250
Epoch 16035/20000: Accuracy = 0.6471
Epoch 16036/20000: Accuracy = 0.3971
Epoch 16037/20000: Accuracy = 0.4118
Epoch 16038/20000: Accuracy = 0.3750
Epoch 16039/20000: Accuracy = 0.3676
Epoch 16040/20000: Accuracy = 0.6765
```

```
Epoch 16041/20000: Accuracy = 0.5735
Epoch 16042/20000: Accuracy = 0.5588
Epoch 16043/20000: Accuracy = 0.5956
Epoch 16044/20000: Accuracy = 0.3897
Epoch 16045/20000: Accuracy = 0.5588
Epoch 16046/20000: Accuracy = 0.3750
Epoch 16047/20000: Accuracy = 0.7059
Epoch 16048/20000: Accuracy = 0.5956
Epoch 16049/20000: Accuracy = 0.5221
Epoch 16050/20000: Accuracy = 0.3824
Epoch 16051/20000: Accuracy = 0.4706
Epoch 16052/20000: Accuracy = 0.4779
Epoch 16053/20000: Accuracy = 0.3824
Epoch 16054/20000: Accuracy = 0.6250
Epoch 16055/20000: Accuracy = 0.4044
Epoch 16056/20000: Accuracy = 0.3824
Epoch 16057/20000: Accuracy = 0.3676
Epoch 16058/20000: Accuracy = 0.6250
Epoch 16059/20000: Accuracy = 0.2941
Epoch 16060/20000: Accuracy = 0.5221
Epoch 16061/20000: Accuracy = 0.3971
Epoch 16062/20000: Accuracy = 0.3750
Epoch 16063/20000: Accuracy = 0.4706
Epoch 16064/20000: Accuracy = 0.3824
Epoch 16065/20000: Accuracy = 0.5368
Epoch 16066/20000: Accuracy = 0.5956
Epoch 16067/20000: Accuracy = 0.3897
Epoch 16068/20000: Accuracy = 0.6691
Epoch 16069/20000: Accuracy = 0.6250
Epoch 16070/20000: Accuracy = 0.6103
Epoch 16071/20000: Accuracy = 0.6176
Epoch 16072/20000: Accuracy = 0.6250
Epoch 16073/20000: Accuracy = 0.6103
Epoch 16074/20000: Accuracy = 0.3971
Epoch 16075/20000: Accuracy = 0.3750
Epoch 16076/20000: Accuracy = 0.3824
Epoch 16077/20000: Accuracy = 0.6250
Epoch 16078/20000: Accuracy = 0.5735
Epoch 16079/20000: Accuracy = 0.4779
Epoch 16080/20000: Accuracy = 0.6250
Epoch 16081/20000: Accuracy = 0.6250
Epoch 16082/20000: Accuracy = 0.3971
Epoch 16083/20000: Accuracy = 0.3897
Epoch 16084/20000: Accuracy = 0.6250
Epoch 16085/20000: Accuracy = 0.4044
Epoch 16086/20000: Accuracy = 0.5882
Epoch 16087/20000: Accuracy = 0.5735
Epoch 16088/20000: Accuracy = 0.6397
```

```
Epoch 16089/20000: Accuracy = 0.3971
Epoch 16090/20000: Accuracy = 0.6176
Epoch 16091/20000: Accuracy = 0.3824
Epoch 16092/20000: Accuracy = 0.6176
Epoch 16093/20000: Accuracy = 0.6250
Epoch 16094/20000: Accuracy = 0.3750
Epoch 16095/20000: Accuracy = 0.3897
Epoch 16096/20000: Accuracy = 0.4044
Epoch 16097/20000: Accuracy = 0.6912
Epoch 16098/20000: Accuracy = 0.3824
Epoch 16099/20000: Accuracy = 0.3750
Epoch 16100/20000: Accuracy = 0.6471
Epoch 16101/20000: Accuracy = 0.3824
Epoch 16102/20000: Accuracy = 0.6103
Epoch 16103/20000: Accuracy = 0.3750
Epoch 16104/20000: Accuracy = 0.6029
Epoch 16105/20000: Accuracy = 0.3824
Epoch 16106/20000: Accuracy = 0.6250
Epoch 16107/20000: Accuracy = 0.6176
Epoch 16108/20000: Accuracy = 0.3897
Epoch 16109/20000: Accuracy = 0.5809
Epoch 16110/20000: Accuracy = 0.3750
Epoch 16111/20000: Accuracy = 0.6176
Epoch 16112/20000: Accuracy = 0.6250
Epoch 16113/20000: Accuracy = 0.6029
Epoch 16114/20000: Accuracy = 0.4118
Epoch 16115/20000: Accuracy = 0.5221
Epoch 16116/20000: Accuracy = 0.6103
Epoch 16117/20000: Accuracy = 0.3824
Epoch 16118/20000: Accuracy = 0.4412
Epoch 16119/20000: Accuracy = 0.3824
Epoch 16120/20000: Accuracy = 0.3971
Epoch 16121/20000: Accuracy = 0.5956
Epoch 16122/20000: Accuracy = 0.3971
Epoch 16123/20000: Accuracy = 0.4559
Epoch 16124/20000: Accuracy = 0.6324
Epoch 16125/20000: Accuracy = 0.3824
Epoch 16126/20000: Accuracy = 0.6250
Epoch 16127/20000: Accuracy = 0.6176
Epoch 16128/20000: Accuracy = 0.6103
Epoch 16129/20000: Accuracy = 0.5882
Epoch 16130/20000: Accuracy = 0.3750
Epoch 16131/20000: Accuracy = 0.3750
Epoch 16132/20000: Accuracy = 0.3750
Epoch 16133/20000: Accuracy = 0.3824
Epoch 16134/20000: Accuracy = 0.3824
Epoch 16135/20000: Accuracy = 0.6250
Epoch 16136/20000: Accuracy = 0.6471
```

```
Epoch 16137/20000: Accuracy = 0.3897
Epoch 16138/20000: Accuracy = 0.3750
Epoch 16139/20000: Accuracy = 0.4265
Epoch 16140/20000: Accuracy = 0.6250
Epoch 16141/20000: Accuracy = 0.3676
Epoch 16142/20000: Accuracy = 0.6103
Epoch 16143/20000: Accuracy = 0.3750
Epoch 16144/20000: Accuracy = 0.6765
Epoch 16145/20000: Accuracy = 0.6397
Epoch 16146/20000: Accuracy = 0.6324
Epoch 16147/20000: Accuracy = 0.3750
Epoch 16148/20000: Accuracy = 0.3824
Epoch 16149/20000: Accuracy = 0.3750
Epoch 16150/20000: Accuracy = 0.5956
Epoch 16151/20000: Accuracy = 0.5882
Epoch 16152/20000: Accuracy = 0.6250
Epoch 16153/20000: Accuracy = 0.6324
Epoch 16154/20000: Accuracy = 0.6176
Epoch 16155/20000: Accuracy = 0.3750
Epoch 16156/20000: Accuracy = 0.3824
Epoch 16157/20000: Accuracy = 0.6250
Epoch 16158/20000: Accuracy = 0.5662
Epoch 16159/20000: Accuracy = 0.6176
Epoch 16160/20000: Accuracy = 0.5735
Epoch 16161/20000: Accuracy = 0.5588
Epoch 16162/20000: Accuracy = 0.6544
Epoch 16163/20000: Accuracy = 0.3897
Epoch 16164/20000: Accuracy = 0.3750
Epoch 16165/20000: Accuracy = 0.3676
Epoch 16166/20000: Accuracy = 0.3750
Epoch 16167/20000: Accuracy = 0.3897
Epoch 16168/20000: Accuracy = 0.4853
Epoch 16169/20000: Accuracy = 0.3824
Epoch 16170/20000: Accuracy = 0.5515
Epoch 16171/20000: Accuracy = 0.3750
Epoch 16172/20000: Accuracy = 0.6250
Epoch 16173/20000: Accuracy = 0.5147
Epoch 16174/20000: Accuracy = 0.5441
Epoch 16175/20000: Accuracy = 0.6176
Epoch 16176/20000: Accuracy = 0.5221
Epoch 16177/20000: Accuracy = 0.3750
Epoch 16178/20000: Accuracy = 0.6250
Epoch 16179/20000: Accuracy = 0.4265
Epoch 16180/20000: Accuracy = 0.3750
Epoch 16181/20000: Accuracy = 0.3750
Epoch 16182/20000: Accuracy = 0.6250
Epoch 16183/20000: Accuracy = 0.4338
Epoch 16184/20000: Accuracy = 0.5588
```

```
Epoch 16185/20000: Accuracy = 0.5809
Epoch 16186/20000: Accuracy = 0.5515
Epoch 16187/20000: Accuracy = 0.6250
Epoch 16188/20000: Accuracy = 0.6544
Epoch 16189/20000: Accuracy = 0.6324
Epoch 16190/20000: Accuracy = 0.4485
Epoch 16191/20000: Accuracy = 0.3824
Epoch 16192/20000: Accuracy = 0.4338
Epoch 16193/20000: Accuracy = 0.3824
Epoch 16194/20000: Accuracy = 0.5074
Epoch 16195/20000: Accuracy = 0.5441
Epoch 16196/20000: Accuracy = 0.6103
Epoch 16197/20000: Accuracy = 0.3750
Epoch 16198/20000: Accuracy = 0.6029
Epoch 16199/20000: Accuracy = 0.6029
Epoch 16200/20000: Accuracy = 0.6029
Epoch 16201/20000: Accuracy = 0.5956
Epoch 16202/20000: Accuracy = 0.3750
Epoch 16203/20000: Accuracy = 0.5000
Epoch 16204/20000: Accuracy = 0.3824
Epoch 16205/20000: Accuracy = 0.2868
Epoch 16206/20000: Accuracy = 0.3824
Epoch 16207/20000: Accuracy = 0.3750
Epoch 16208/20000: Accuracy = 0.5956
Epoch 16209/20000: Accuracy = 0.3750
Epoch 16210/20000: Accuracy = 0.6250
Epoch 16211/20000: Accuracy = 0.5294
Epoch 16212/20000: Accuracy = 0.6250
Epoch 16213/20000: Accuracy = 0.3971
Epoch 16214/20000: Accuracy = 0.6250
Epoch 16215/20000: Accuracy = 0.6250
Epoch 16216/20000: Accuracy = 0.4706
Epoch 16217/20000: Accuracy = 0.6250
Epoch 16218/20000: Accuracy = 0.4118
Epoch 16219/20000: Accuracy = 0.6691
Epoch 16220/20000: Accuracy = 0.5882
Epoch 16221/20000: Accuracy = 0.6544
Epoch 16222/20000: Accuracy = 0.4044
Epoch 16223/20000: Accuracy = 0.6250
Epoch 16224/20000: Accuracy = 0.6176
Epoch 16225/20000: Accuracy = 0.4191
Epoch 16226/20000: Accuracy = 0.6176
Epoch 16227/20000: Accuracy = 0.6103
Epoch 16228/20000: Accuracy = 0.6250
Epoch 16229/20000: Accuracy = 0.5882
Epoch 16230/20000: Accuracy = 0.3529
Epoch 16231/20000: Accuracy = 0.6250
Epoch 16232/20000: Accuracy = 0.6250
```

```
Epoch 16233/20000: Accuracy = 0.4338
Epoch 16234/20000: Accuracy = 0.6029
Epoch 16235/20000: Accuracy = 0.3309
Epoch 16236/20000: Accuracy = 0.3897
Epoch 16237/20000: Accuracy = 0.5221
Epoch 16238/20000: Accuracy = 0.3750
Epoch 16239/20000: Accuracy = 0.3750
Epoch 16240/20000: Accuracy = 0.3897
Epoch 16241/20000: Accuracy = 0.3750
Epoch 16242/20000: Accuracy = 0.3750
Epoch 16243/20000: Accuracy = 0.3750
Epoch 16244/20000: Accuracy = 0.4044
Epoch 16245/20000: Accuracy = 0.4118
Epoch 16246/20000: Accuracy = 0.6250
Epoch 16247/20000: Accuracy = 0.6103
Epoch 16248/20000: Accuracy = 0.3309
Epoch 16249/20000: Accuracy = 0.3750
Epoch 16250/20000: Accuracy = 0.6471
Epoch 16251/20000: Accuracy = 0.6250
Epoch 16252/20000: Accuracy = 0.5662
Epoch 16253/20000: Accuracy = 0.4044
Epoch 16254/20000: Accuracy = 0.3971
Epoch 16255/20000: Accuracy = 0.5441
Epoch 16256/20000: Accuracy = 0.4191
Epoch 16257/20000: Accuracy = 0.3824
Epoch 16258/20000: Accuracy = 0.3824
Epoch 16259/20000: Accuracy = 0.6397
Epoch 16260/20000: Accuracy = 0.6176
Epoch 16261/20000: Accuracy = 0.3750
Epoch 16262/20000: Accuracy = 0.4191
Epoch 16263/20000: Accuracy = 0.6176
Epoch 16264/20000: Accuracy = 0.6029
Epoch 16265/20000: Accuracy = 0.3824
Epoch 16266/20000: Accuracy = 0.5882
Epoch 16267/20000: Accuracy = 0.3529
Epoch 16268/20000: Accuracy = 0.4191
Epoch 16269/20000: Accuracy = 0.6176
Epoch 16270/20000: Accuracy = 0.4118
Epoch 16271/20000: Accuracy = 0.6176
Epoch 16272/20000: Accuracy = 0.5809
Epoch 16273/20000: Accuracy = 0.3750
Epoch 16274/20000: Accuracy = 0.5000
Epoch 16275/20000: Accuracy = 0.3676
Epoch 16276/20000: Accuracy = 0.3824
Epoch 16277/20000: Accuracy = 0.4485
Epoch 16278/20000: Accuracy = 0.3750
Epoch 16279/20000: Accuracy = 0.4706
Epoch 16280/20000: Accuracy = 0.5515
```

```
Epoch 16281/20000: Accuracy = 0.5882
Epoch 16282/20000: Accuracy = 0.4485
Epoch 16283/20000: Accuracy = 0.6176
Epoch 16284/20000: Accuracy = 0.3750
Epoch 16285/20000: Accuracy = 0.5368
Epoch 16286/20000: Accuracy = 0.3824
Epoch 16287/20000: Accuracy = 0.6250
Epoch 16288/20000: Accuracy = 0.4338
Epoch 16289/20000: Accuracy = 0.6176
Epoch 16290/20000: Accuracy = 0.6250
Epoch 16291/20000: Accuracy = 0.6176
Epoch 16292/20000: Accuracy = 0.6176
Epoch 16293/20000: Accuracy = 0.4265
Epoch 16294/20000: Accuracy = 0.3897
Epoch 16295/20000: Accuracy = 0.3897
Epoch 16296/20000: Accuracy = 0.3750
Epoch 16297/20000: Accuracy = 0.6176
Epoch 16298/20000: Accuracy = 0.3824
Epoch 16299/20000: Accuracy = 0.3309
Epoch 16300/20000: Accuracy = 0.4779
Epoch 16301/20000: Accuracy = 0.3824
Epoch 16302/20000: Accuracy = 0.6029
Epoch 16303/20000: Accuracy = 0.3603
Epoch 16304/20000: Accuracy = 0.6250
Epoch 16305/20000: Accuracy = 0.5735
Epoch 16306/20000: Accuracy = 0.6029
Epoch 16307/20000: Accuracy = 0.6103
Epoch 16308/20000: Accuracy = 0.4706
Epoch 16309/20000: Accuracy = 0.3971
Epoch 16310/20000: Accuracy = 0.3750
Epoch 16311/20000: Accuracy = 0.6765
Epoch 16312/20000: Accuracy = 0.6250
Epoch 16313/20000: Accuracy = 0.6250
Epoch 16314/20000: Accuracy = 0.5074
Epoch 16315/20000: Accuracy = 0.3309
Epoch 16316/20000: Accuracy = 0.5882
Epoch 16317/20000: Accuracy = 0.6176
Epoch 16318/20000: Accuracy = 0.5515
Epoch 16319/20000: Accuracy = 0.6103
Epoch 16320/20000: Accuracy = 0.6176
Epoch 16321/20000: Accuracy = 0.5294
Epoch 16322/20000: Accuracy = 0.5735
Epoch 16323/20000: Accuracy = 0.4044
Epoch 16324/20000: Accuracy = 0.6912
Epoch 16325/20000: Accuracy = 0.3676
Epoch 16326/20000: Accuracy = 0.6103
Epoch 16327/20000: Accuracy = 0.6103
Epoch 16328/20000: Accuracy = 0.3824
```

```
Epoch 16329/20000: Accuracy = 0.3897
Epoch 16330/20000: Accuracy = 0.5735
Epoch 16331/20000: Accuracy = 0.3897
Epoch 16332/20000: Accuracy = 0.3824
Epoch 16333/20000: Accuracy = 0.4044
Epoch 16334/20000: Accuracy = 0.3897
Epoch 16335/20000: Accuracy = 0.3015
Epoch 16336/20000: Accuracy = 0.4485
Epoch 16337/20000: Accuracy = 0.5221
Epoch 16338/20000: Accuracy = 0.6103
Epoch 16339/20000: Accuracy = 0.5588
Epoch 16340/20000: Accuracy = 0.5882
Epoch 16341/20000: Accuracy = 0.6250
Epoch 16342/20000: Accuracy = 0.3750
Epoch 16343/20000: Accuracy = 0.6103
Epoch 16344/20000: Accuracy = 0.6250
Epoch 16345/20000: Accuracy = 0.3750
Epoch 16346/20000: Accuracy = 0.3824
Epoch 16347/20000: Accuracy = 0.4412
Epoch 16348/20000: Accuracy = 0.3750
Epoch 16349/20000: Accuracy = 0.5588
Epoch 16350/20000: Accuracy = 0.3750
Epoch 16351/20000: Accuracy = 0.5662
Epoch 16352/20000: Accuracy = 0.3824
Epoch 16353/20000: Accuracy = 0.3824
Epoch 16354/20000: Accuracy = 0.6029
Epoch 16355/20000: Accuracy = 0.5588
Epoch 16356/20000: Accuracy = 0.3824
Epoch 16357/20000: Accuracy = 0.6103
Epoch 16358/20000: Accuracy = 0.3897
Epoch 16359/20000: Accuracy = 0.4044
Epoch 16360/20000: Accuracy = 0.6691
Epoch 16361/20000: Accuracy = 0.6324
Epoch 16362/20000: Accuracy = 0.3676
Epoch 16363/20000: Accuracy = 0.6176
Epoch 16364/20000: Accuracy = 0.6176
Epoch 16365/20000: Accuracy = 0.4044
Epoch 16366/20000: Accuracy = 0.6250
Epoch 16367/20000: Accuracy = 0.3897
Epoch 16368/20000: Accuracy = 0.6250
Epoch 16369/20000: Accuracy = 0.6544
Epoch 16370/20000: Accuracy = 0.5882
Epoch 16371/20000: Accuracy = 0.3824
Epoch 16372/20000: Accuracy = 0.6176
Epoch 16373/20000: Accuracy = 0.5735
Epoch 16374/20000: Accuracy = 0.3676
Epoch 16375/20000: Accuracy = 0.5882
Epoch 16376/20000: Accuracy = 0.4118
```

```
Epoch 16377/20000: Accuracy = 0.3750
Epoch 16378/20000: Accuracy = 0.3897
Epoch 16379/20000: Accuracy = 0.6029
Epoch 16380/20000: Accuracy = 0.3824
Epoch 16381/20000: Accuracy = 0.3971
Epoch 16382/20000: Accuracy = 0.5515
Epoch 16383/20000: Accuracy = 0.6324
Epoch 16384/20000: Accuracy = 0.5588
Epoch 16385/20000: Accuracy = 0.4412
Epoch 16386/20000: Accuracy = 0.6250
Epoch 16387/20000: Accuracy = 0.6250
Epoch 16388/20000: Accuracy = 0.5588
Epoch 16389/20000: Accuracy = 0.5588
Epoch 16390/20000: Accuracy = 0.4338
Epoch 16391/20000: Accuracy = 0.3750
Epoch 16392/20000: Accuracy = 0.3750
Epoch 16393/20000: Accuracy = 0.3971
Epoch 16394/20000: Accuracy = 0.5882
Epoch 16395/20000: Accuracy = 0.3897
Epoch 16396/20000: Accuracy = 0.6176
Epoch 16397/20000: Accuracy = 0.3750
Epoch 16398/20000: Accuracy = 0.5809
Epoch 16399/20000: Accuracy = 0.6250
Epoch 16400/20000: Accuracy = 0.6103
Epoch 16401/20000: Accuracy = 0.3750
Epoch 16402/20000: Accuracy = 0.6250
Epoch 16403/20000: Accuracy = 0.6176
Epoch 16404/20000: Accuracy = 0.3897
Epoch 16405/20000: Accuracy = 0.5809
Epoch 16406/20000: Accuracy = 0.6250
Epoch 16407/20000: Accuracy = 0.3750
Epoch 16408/20000: Accuracy = 0.3750
Epoch 16409/20000: Accuracy = 0.3897
Epoch 16410/20000: Accuracy = 0.3824
Epoch 16411/20000: Accuracy = 0.6029
Epoch 16412/20000: Accuracy = 0.5882
Epoch 16413/20000: Accuracy = 0.6250
Epoch 16414/20000: Accuracy = 0.6471
Epoch 16415/20000: Accuracy = 0.4559
Epoch 16416/20000: Accuracy = 0.6176
Epoch 16417/20000: Accuracy = 0.3309
Epoch 16418/20000: Accuracy = 0.3750
Epoch 16419/20000: Accuracy = 0.4485
Epoch 16420/20000: Accuracy = 0.3603
Epoch 16421/20000: Accuracy = 0.6176
Epoch 16422/20000: Accuracy = 0.3824
Epoch 16423/20000: Accuracy = 0.6176
Epoch 16424/20000: Accuracy = 0.6176
```

```
Epoch 16425/20000: Accuracy = 0.3971
Epoch 16426/20000: Accuracy = 0.3750
Epoch 16427/20000: Accuracy = 0.3015
Epoch 16428/20000: Accuracy = 0.3971
Epoch 16429/20000: Accuracy = 0.3824
Epoch 16430/20000: Accuracy = 0.3897
Epoch 16431/20000: Accuracy = 0.3603
Epoch 16432/20000: Accuracy = 0.3971
Epoch 16433/20000: Accuracy = 0.6176
Epoch 16434/20000: Accuracy = 0.6176
Epoch 16435/20000: Accuracy = 0.3897
Epoch 16436/20000: Accuracy = 0.6250
Epoch 16437/20000: Accuracy = 0.4118
Epoch 16438/20000: Accuracy = 0.6176
Epoch 16439/20000: Accuracy = 0.5809
Epoch 16440/20000: Accuracy = 0.6324
Epoch 16441/20000: Accuracy = 0.6618
Epoch 16442/20000: Accuracy = 0.5294
Epoch 16443/20000: Accuracy = 0.3750
Epoch 16444/20000: Accuracy = 0.4118
Epoch 16445/20000: Accuracy = 0.6397
Epoch 16446/20000: Accuracy = 0.3971
Epoch 16447/20000: Accuracy = 0.6176
Epoch 16448/20000: Accuracy = 0.6250
Epoch 16449/20000: Accuracy = 0.3750
Epoch 16450/20000: Accuracy = 0.4559
Epoch 16451/20000: Accuracy = 0.6103
Epoch 16452/20000: Accuracy = 0.4191
Epoch 16453/20000: Accuracy = 0.5735
Epoch 16454/20000: Accuracy = 0.3676
Epoch 16455/20000: Accuracy = 0.6176
Epoch 16456/20000: Accuracy = 0.6250
Epoch 16457/20000: Accuracy = 0.3529
Epoch 16458/20000: Accuracy = 0.3897
Epoch 16459/20000: Accuracy = 0.6250
Epoch 16460/20000: Accuracy = 0.5956
Epoch 16461/20000: Accuracy = 0.5662
Epoch 16462/20000: Accuracy = 0.6250
Epoch 16463/20000: Accuracy = 0.3676
Epoch 16464/20000: Accuracy = 0.4044
Epoch 16465/20000: Accuracy = 0.5588
Epoch 16466/20000: Accuracy = 0.6471
Epoch 16467/20000: Accuracy = 0.3750
Epoch 16468/20000: Accuracy = 0.3750
Epoch 16469/20000: Accuracy = 0.3309
Epoch 16470/20000: Accuracy = 0.4706
Epoch 16471/20000: Accuracy = 0.4118
Epoch 16472/20000: Accuracy = 0.6029
```

```
Epoch 16473/20000: Accuracy = 0.6912
Epoch 16474/20000: Accuracy = 0.5588
Epoch 16475/20000: Accuracy = 0.5588
Epoch 16476/20000: Accuracy = 0.6250
Epoch 16477/20000: Accuracy = 0.5882
Epoch 16478/20000: Accuracy = 0.3529
Epoch 16479/20000: Accuracy = 0.5882
Epoch 16480/20000: Accuracy = 0.3824
Epoch 16481/20000: Accuracy = 0.6029
Epoch 16482/20000: Accuracy = 0.3750
Epoch 16483/20000: Accuracy = 0.3824
Epoch 16484/20000: Accuracy = 0.3750
Epoch 16485/20000: Accuracy = 0.6176
Epoch 16486/20000: Accuracy = 0.3676
Epoch 16487/20000: Accuracy = 0.3971
Epoch 16488/20000: Accuracy = 0.6250
Epoch 16489/20000: Accuracy = 0.6176
Epoch 16490/20000: Accuracy = 0.3971
Epoch 16491/20000: Accuracy = 0.6250
Epoch 16492/20000: Accuracy = 0.3824
Epoch 16493/20000: Accuracy = 0.6103
Epoch 16494/20000: Accuracy = 0.3750
Epoch 16495/20000: Accuracy = 0.6324
Epoch 16496/20000: Accuracy = 0.3235
Epoch 16497/20000: Accuracy = 0.5809
Epoch 16498/20000: Accuracy = 0.6250
Epoch 16499/20000: Accuracy = 0.5441
Epoch 16500/20000: Accuracy = 0.3750
Epoch 16501/20000: Accuracy = 0.4118
Epoch 16502/20000: Accuracy = 0.2941
Epoch 16503/20000: Accuracy = 0.6176
Epoch 16504/20000: Accuracy = 0.6250
Epoch 16505/20000: Accuracy = 0.3750
Epoch 16506/20000: Accuracy = 0.5809
Epoch 16507/20000: Accuracy = 0.4044
Epoch 16508/20000: Accuracy = 0.6250
Epoch 16509/20000: Accuracy = 0.7500
Epoch 16510/20000: Accuracy = 0.6176
Epoch 16511/20000: Accuracy = 0.6176
Epoch 16512/20000: Accuracy = 0.3971
Epoch 16513/20000: Accuracy = 0.5809
Epoch 16514/20000: Accuracy = 0.6029
Epoch 16515/20000: Accuracy = 0.6471
Epoch 16516/20000: Accuracy = 0.3750
Epoch 16517/20000: Accuracy = 0.6250
Epoch 16518/20000: Accuracy = 0.6250
Epoch 16519/20000: Accuracy = 0.6324
Epoch 16520/20000: Accuracy = 0.4191
```

```
Epoch 16521/20000: Accuracy = 0.3750
Epoch 16522/20000: Accuracy = 0.5662
Epoch 16523/20000: Accuracy = 0.3750
Epoch 16524/20000: Accuracy = 0.6544
Epoch 16525/20000: Accuracy = 0.3750
Epoch 16526/20000: Accuracy = 0.5809
Epoch 16527/20000: Accuracy = 0.4191
Epoch 16528/20000: Accuracy = 0.5735
Epoch 16529/20000: Accuracy = 0.4191
Epoch 16530/20000: Accuracy = 0.3750
Epoch 16531/20000: Accuracy = 0.6324
Epoch 16532/20000: Accuracy = 0.6250
Epoch 16533/20000: Accuracy = 0.4191
Epoch 16534/20000: Accuracy = 0.5735
Epoch 16535/20000: Accuracy = 0.6324
Epoch 16536/20000: Accuracy = 0.6250
Epoch 16537/20000: Accuracy = 0.5147
Epoch 16538/20000: Accuracy = 0.3162
Epoch 16539/20000: Accuracy = 0.3750
Epoch 16540/20000: Accuracy = 0.3603
Epoch 16541/20000: Accuracy = 0.6250
Epoch 16542/20000: Accuracy = 0.6324
Epoch 16543/20000: Accuracy = 0.3750
Epoch 16544/20000: Accuracy = 0.5441
Epoch 16545/20000: Accuracy = 0.6250
Epoch 16546/20000: Accuracy = 0.6103
Epoch 16547/20000: Accuracy = 0.3162
Epoch 16548/20000: Accuracy = 0.5368
Epoch 16549/20000: Accuracy = 0.5956
Epoch 16550/20000: Accuracy = 0.3162
Epoch 16551/20000: Accuracy = 0.5809
Epoch 16552/20000: Accuracy = 0.5074
Epoch 16553/20000: Accuracy = 0.6471
Epoch 16554/20000: Accuracy = 0.3603
Epoch 16555/20000: Accuracy = 0.6103
Epoch 16556/20000: Accuracy = 0.5588
Epoch 16557/20000: Accuracy = 0.6029
Epoch 16558/20000: Accuracy = 0.5000
Epoch 16559/20000: Accuracy = 0.5882
Epoch 16560/20000: Accuracy = 0.6397
Epoch 16561/20000: Accuracy = 0.3750
Epoch 16562/20000: Accuracy = 0.3971
Epoch 16563/20000: Accuracy = 0.5294
Epoch 16564/20000: Accuracy = 0.6176
Epoch 16565/20000: Accuracy = 0.4338
Epoch 16566/20000: Accuracy = 0.6176
Epoch 16567/20000: Accuracy = 0.4485
Epoch 16568/20000: Accuracy = 0.3971
```

```
Epoch 16569/20000: Accuracy = 0.4265
Epoch 16570/20000: Accuracy = 0.3750
Epoch 16571/20000: Accuracy = 0.5000
Epoch 16572/20000: Accuracy = 0.5956
Epoch 16573/20000: Accuracy = 0.5809
Epoch 16574/20000: Accuracy = 0.6176
Epoch 16575/20000: Accuracy = 0.6103
Epoch 16576/20000: Accuracy = 0.4853
Epoch 16577/20000: Accuracy = 0.6176
Epoch 16578/20000: Accuracy = 0.6397
Epoch 16579/20000: Accuracy = 0.2353
Epoch 16580/20000: Accuracy = 0.6176
Epoch 16581/20000: Accuracy = 0.4044
Epoch 16582/20000: Accuracy = 0.6103
Epoch 16583/20000: Accuracy = 0.5441
Epoch 16584/20000: Accuracy = 0.6250
Epoch 16585/20000: Accuracy = 0.6250
Epoch 16586/20000: Accuracy = 0.6250
Epoch 16587/20000: Accuracy = 0.4853
Epoch 16588/20000: Accuracy = 0.4118
Epoch 16589/20000: Accuracy = 0.4191
Epoch 16590/20000: Accuracy = 0.6176
Epoch 16591/20000: Accuracy = 0.3824
Epoch 16592/20000: Accuracy = 0.3750
Epoch 16593/20000: Accuracy = 0.3971
Epoch 16594/20000: Accuracy = 0.6324
Epoch 16595/20000: Accuracy = 0.6397
Epoch 16596/20000: Accuracy = 0.6176
Epoch 16597/20000: Accuracy = 0.3676
Epoch 16598/20000: Accuracy = 0.6029
Epoch 16599/20000: Accuracy = 0.4412
Epoch 16600/20000: Accuracy = 0.6176
Epoch 16601/20000: Accuracy = 0.7132
Epoch 16602/20000: Accuracy = 0.6250
Epoch 16603/20000: Accuracy = 0.3750
Epoch 16604/20000: Accuracy = 0.3897
Epoch 16605/20000: Accuracy = 0.6176
Epoch 16606/20000: Accuracy = 0.3309
Epoch 16607/20000: Accuracy = 0.6103
Epoch 16608/20000: Accuracy = 0.5956
Epoch 16609/20000: Accuracy = 0.6250
Epoch 16610/20000: Accuracy = 0.5662
Epoch 16611/20000: Accuracy = 0.6176
Epoch 16612/20000: Accuracy = 0.6250
Epoch 16613/20000: Accuracy = 0.4044
Epoch 16614/20000: Accuracy = 0.3824
Epoch 16615/20000: Accuracy = 0.4044
Epoch 16616/20000: Accuracy = 0.4853
```

```
Epoch 16617/20000: Accuracy = 0.6103
Epoch 16618/20000: Accuracy = 0.6250
Epoch 16619/20000: Accuracy = 0.4191
Epoch 16620/20000: Accuracy = 0.4191
Epoch 16621/20000: Accuracy = 0.6103
Epoch 16622/20000: Accuracy = 0.3750
Epoch 16623/20000: Accuracy = 0.5882
Epoch 16624/20000: Accuracy = 0.6250
Epoch 16625/20000: Accuracy = 0.5956
Epoch 16626/20000: Accuracy = 0.6029
Epoch 16627/20000: Accuracy = 0.4044
Epoch 16628/20000: Accuracy = 0.4191
Epoch 16629/20000: Accuracy = 0.3750
Epoch 16630/20000: Accuracy = 0.4191
Epoch 16631/20000: Accuracy = 0.6029
Epoch 16632/20000: Accuracy = 0.6176
Epoch 16633/20000: Accuracy = 0.5956
Epoch 16634/20000: Accuracy = 0.6029
Epoch 16635/20000: Accuracy = 0.4412
Epoch 16636/20000: Accuracy = 0.5809
Epoch 16637/20000: Accuracy = 0.3824
Epoch 16638/20000: Accuracy = 0.6250
Epoch 16639/20000: Accuracy = 0.6250
Epoch 16640/20000: Accuracy = 0.3750
Epoch 16641/20000: Accuracy = 0.3824
Epoch 16642/20000: Accuracy = 0.3897
Epoch 16643/20000: Accuracy = 0.6176
Epoch 16644/20000: Accuracy = 0.3676
Epoch 16645/20000: Accuracy = 0.6250
Epoch 16646/20000: Accuracy = 0.5735
Epoch 16647/20000: Accuracy = 0.3897
Epoch 16648/20000: Accuracy = 0.3750
Epoch 16649/20000: Accuracy = 0.6250
Epoch 16650/20000: Accuracy = 0.6250
Epoch 16651/20000: Accuracy = 0.6250
Epoch 16652/20000: Accuracy = 0.3750
Epoch 16653/20000: Accuracy = 0.5662
Epoch 16654/20000: Accuracy = 0.5000
Epoch 16655/20000: Accuracy = 0.6176
Epoch 16656/20000: Accuracy = 0.5662
Epoch 16657/20000: Accuracy = 0.3750
Epoch 16658/20000: Accuracy = 0.5000
Epoch 16659/20000: Accuracy = 0.6250
Epoch 16660/20000: Accuracy = 0.3750
Epoch 16661/20000: Accuracy = 0.5735
Epoch 16662/20000: Accuracy = 0.4632
Epoch 16663/20000: Accuracy = 0.3456
Epoch 16664/20000: Accuracy = 0.5588
```

```
Epoch 16665/20000: Accuracy = 0.6250
Epoch 16666/20000: Accuracy = 0.5809
Epoch 16667/20000: Accuracy = 0.3897
Epoch 16668/20000: Accuracy = 0.3603
Epoch 16669/20000: Accuracy = 0.3676
Epoch 16670/20000: Accuracy = 0.3750
Epoch 16671/20000: Accuracy = 0.5294
Epoch 16672/20000: Accuracy = 0.6250
Epoch 16673/20000: Accuracy = 0.3897
Epoch 16674/20000: Accuracy = 0.6397
Epoch 16675/20000: Accuracy = 0.7059
Epoch 16676/20000: Accuracy = 0.4044
Epoch 16677/20000: Accuracy = 0.5882
Epoch 16678/20000: Accuracy = 0.6250
Epoch 16679/20000: Accuracy = 0.3897
Epoch 16680/20000: Accuracy = 0.3676
Epoch 16681/20000: Accuracy = 0.3824
Epoch 16682/20000: Accuracy = 0.5882
Epoch 16683/20000: Accuracy = 0.5809
Epoch 16684/20000: Accuracy = 0.3750
Epoch 16685/20000: Accuracy = 0.3676
Epoch 16686/20000: Accuracy = 0.6103
Epoch 16687/20000: Accuracy = 0.3971
Epoch 16688/20000: Accuracy = 0.3750
Epoch 16689/20000: Accuracy = 0.6765
Epoch 16690/20000: Accuracy = 0.4191
Epoch 16691/20000: Accuracy = 0.3529
Epoch 16692/20000: Accuracy = 0.6250
Epoch 16693/20000: Accuracy = 0.3529
Epoch 16694/20000: Accuracy = 0.4559
Epoch 16695/20000: Accuracy = 0.5882
Epoch 16696/20000: Accuracy = 0.6250
Epoch 16697/20000: Accuracy = 0.4853
Epoch 16698/20000: Accuracy = 0.3824
Epoch 16699/20000: Accuracy = 0.3971
Epoch 16700/20000: Accuracy = 0.3824
Epoch 16701/20000: Accuracy = 0.4118
Epoch 16702/20000: Accuracy = 0.6544
Epoch 16703/20000: Accuracy = 0.6176
Epoch 16704/20000: Accuracy = 0.6544
Epoch 16705/20000: Accuracy = 0.3824
Epoch 16706/20000: Accuracy = 0.3750
Epoch 16707/20000: Accuracy = 0.4265
Epoch 16708/20000: Accuracy = 0.5956
Epoch 16709/20000: Accuracy = 0.3897
Epoch 16710/20000: Accuracy = 0.6250
Epoch 16711/20000: Accuracy = 0.3971
Epoch 16712/20000: Accuracy = 0.5956
```

```
Epoch 16713/20000: Accuracy = 0.6176
Epoch 16714/20000: Accuracy = 0.6103
Epoch 16715/20000: Accuracy = 0.5368
Epoch 16716/20000: Accuracy = 0.6176
Epoch 16717/20000: Accuracy = 0.6103
Epoch 16718/20000: Accuracy = 0.3603
Epoch 16719/20000: Accuracy = 0.7132
Epoch 16720/20000: Accuracy = 0.4706
Epoch 16721/20000: Accuracy = 0.5662
Epoch 16722/20000: Accuracy = 0.3750
Epoch 16723/20000: Accuracy = 0.3750
Epoch 16724/20000: Accuracy = 0.6176
Epoch 16725/20000: Accuracy = 0.6176
Epoch 16726/20000: Accuracy = 0.6029
Epoch 16727/20000: Accuracy = 0.6103
Epoch 16728/20000: Accuracy = 0.5882
Epoch 16729/20000: Accuracy = 0.5662
Epoch 16730/20000: Accuracy = 0.6250
Epoch 16731/20000: Accuracy = 0.4044
Epoch 16732/20000: Accuracy = 0.5882
Epoch 16733/20000: Accuracy = 0.5441
Epoch 16734/20000: Accuracy = 0.4559
Epoch 16735/20000: Accuracy = 0.3603
Epoch 16736/20000: Accuracy = 0.3088
Epoch 16737/20000: Accuracy = 0.6397
Epoch 16738/20000: Accuracy = 0.6103
Epoch 16739/20000: Accuracy = 0.3824
Epoch 16740/20000: Accuracy = 0.6176
Epoch 16741/20000: Accuracy = 0.6176
Epoch 16742/20000: Accuracy = 0.6103
Epoch 16743/20000: Accuracy = 0.6250
Epoch 16744/20000: Accuracy = 0.6691
Epoch 16745/20000: Accuracy = 0.6029
Epoch 16746/20000: Accuracy = 0.4485
Epoch 16747/20000: Accuracy = 0.6544
Epoch 16748/20000: Accuracy = 0.6176
Epoch 16749/20000: Accuracy = 0.6029
Epoch 16750/20000: Accuracy = 0.5515
Epoch 16751/20000: Accuracy = 0.6250
Epoch 16752/20000: Accuracy = 0.3750
Epoch 16753/20000: Accuracy = 0.6324
Epoch 16754/20000: Accuracy = 0.3382
Epoch 16755/20000: Accuracy = 0.3750
Epoch 16756/20000: Accuracy = 0.6103
Epoch 16757/20000: Accuracy = 0.3750
Epoch 16758/20000: Accuracy = 0.5588
Epoch 16759/20000: Accuracy = 0.5368
Epoch 16760/20000: Accuracy = 0.6029
```

```
Epoch 16761/20000: Accuracy = 0.4485
Epoch 16762/20000: Accuracy = 0.6029
Epoch 16763/20000: Accuracy = 0.3824
Epoch 16764/20000: Accuracy = 0.6103
Epoch 16765/20000: Accuracy = 0.3971
Epoch 16766/20000: Accuracy = 0.6618
Epoch 16767/20000: Accuracy = 0.6103
Epoch 16768/20000: Accuracy = 0.3824
Epoch 16769/20000: Accuracy = 0.6176
Epoch 16770/20000: Accuracy = 0.6103
Epoch 16771/20000: Accuracy = 0.5368
Epoch 16772/20000: Accuracy = 0.4926
Epoch 16773/20000: Accuracy = 0.3897
Epoch 16774/20000: Accuracy = 0.6029
Epoch 16775/20000: Accuracy = 0.6029
Epoch 16776/20000: Accuracy = 0.6618
Epoch 16777/20000: Accuracy = 0.6250
Epoch 16778/20000: Accuracy = 0.3897
Epoch 16779/20000: Accuracy = 0.3971
Epoch 16780/20000: Accuracy = 0.6250
Epoch 16781/20000: Accuracy = 0.3824
Epoch 16782/20000: Accuracy = 0.3529
Epoch 16783/20000: Accuracy = 0.3750
Epoch 16784/20000: Accuracy = 0.3676
Epoch 16785/20000: Accuracy = 0.3015
Epoch 16786/20000: Accuracy = 0.6471
Epoch 16787/20000: Accuracy = 0.4265
Epoch 16788/20000: Accuracy = 0.6176
Epoch 16789/20000: Accuracy = 0.4412
Epoch 16790/20000: Accuracy = 0.3750
Epoch 16791/20000: Accuracy = 0.4265
Epoch 16792/20000: Accuracy = 0.6029
Epoch 16793/20000: Accuracy = 0.6176
Epoch 16794/20000: Accuracy = 0.3603
Epoch 16795/20000: Accuracy = 0.3676
Epoch 16796/20000: Accuracy = 0.6029
Epoch 16797/20000: Accuracy = 0.6250
Epoch 16798/20000: Accuracy = 0.5662
Epoch 16799/20000: Accuracy = 0.3750
Epoch 16800/20000: Accuracy = 0.4559
Epoch 16801/20000: Accuracy = 0.2941
Epoch 16802/20000: Accuracy = 0.6250
Epoch 16803/20000: Accuracy = 0.4044
Epoch 16804/20000: Accuracy = 0.3750
Epoch 16805/20000: Accuracy = 0.3824
Epoch 16806/20000: Accuracy = 0.5735
Epoch 16807/20000: Accuracy = 0.3824
Epoch 16808/20000: Accuracy = 0.3162
```

```
Epoch 16809/20000: Accuracy = 0.5809
Epoch 16810/20000: Accuracy = 0.2574
Epoch 16811/20000: Accuracy = 0.5515
Epoch 16812/20000: Accuracy = 0.4265
Epoch 16813/20000: Accuracy = 0.5956
Epoch 16814/20000: Accuracy = 0.6029
Epoch 16815/20000: Accuracy = 0.3897
Epoch 16816/20000: Accuracy = 0.5147
Epoch 16817/20000: Accuracy = 0.6029
Epoch 16818/20000: Accuracy = 0.4706
Epoch 16819/20000: Accuracy = 0.3971
Epoch 16820/20000: Accuracy = 0.5147
Epoch 16821/20000: Accuracy = 0.5956
Epoch 16822/20000: Accuracy = 0.4485
Epoch 16823/20000: Accuracy = 0.4044
Epoch 16824/20000: Accuracy = 0.3603
Epoch 16825/20000: Accuracy = 0.3603
Epoch 16826/20000: Accuracy = 0.3676
Epoch 16827/20000: Accuracy = 0.6250
Epoch 16828/20000: Accuracy = 0.6250
Epoch 16829/20000: Accuracy = 0.6029
Epoch 16830/20000: Accuracy = 0.6176
Epoch 16831/20000: Accuracy = 0.5882
Epoch 16832/20000: Accuracy = 0.4338
Epoch 16833/20000: Accuracy = 0.4044
Epoch 16834/20000: Accuracy = 0.3750
Epoch 16835/20000: Accuracy = 0.4485
Epoch 16836/20000: Accuracy = 0.4265
Epoch 16837/20000: Accuracy = 0.2794
Epoch 16838/20000: Accuracy = 0.3750
Epoch 16839/20000: Accuracy = 0.5809
Epoch 16840/20000: Accuracy = 0.6250
Epoch 16841/20000: Accuracy = 0.3824
Epoch 16842/20000: Accuracy = 0.3971
Epoch 16843/20000: Accuracy = 0.6250
Epoch 16844/20000: Accuracy = 0.3824
Epoch 16845/20000: Accuracy = 0.4779
Epoch 16846/20000: Accuracy = 0.3676
Epoch 16847/20000: Accuracy = 0.6838
Epoch 16848/20000: Accuracy = 0.2794
Epoch 16849/20000: Accuracy = 0.4191
Epoch 16850/20000: Accuracy = 0.6250
Epoch 16851/20000: Accuracy = 0.5735
Epoch 16852/20000: Accuracy = 0.4265
Epoch 16853/20000: Accuracy = 0.3971
Epoch 16854/20000: Accuracy = 0.6029
Epoch 16855/20000: Accuracy = 0.3603
Epoch 16856/20000: Accuracy = 0.3750
```

```
Epoch 16857/20000: Accuracy = 0.6397
Epoch 16858/20000: Accuracy = 0.3971
Epoch 16859/20000: Accuracy = 0.3824
Epoch 16860/20000: Accuracy = 0.6250
Epoch 16861/20000: Accuracy = 0.6176
Epoch 16862/20000: Accuracy = 0.3750
Epoch 16863/20000: Accuracy = 0.3824
Epoch 16864/20000: Accuracy = 0.6176
Epoch 16865/20000: Accuracy = 0.4265
Epoch 16866/20000: Accuracy = 0.4412
Epoch 16867/20000: Accuracy = 0.3971
Epoch 16868/20000: Accuracy = 0.4191
Epoch 16869/20000: Accuracy = 0.5956
Epoch 16870/20000: Accuracy = 0.6250
Epoch 16871/20000: Accuracy = 0.4044
Epoch 16872/20000: Accuracy = 0.4265
Epoch 16873/20000: Accuracy = 0.5735
Epoch 16874/20000: Accuracy = 0.3971
Epoch 16875/20000: Accuracy = 0.5882
Epoch 16876/20000: Accuracy = 0.5882
Epoch 16877/20000: Accuracy = 0.6544
Epoch 16878/20000: Accuracy = 0.6544
Epoch 16879/20000: Accuracy = 0.7132
Epoch 16880/20000: Accuracy = 0.6838
Epoch 16881/20000: Accuracy = 0.3824
Epoch 16882/20000: Accuracy = 0.6250
Epoch 16883/20000: Accuracy = 0.5588
Epoch 16884/20000: Accuracy = 0.3824
Epoch 16885/20000: Accuracy = 0.4412
Epoch 16886/20000: Accuracy = 0.5956
Epoch 16887/20000: Accuracy = 0.4118
Epoch 16888/20000: Accuracy = 0.4632
Epoch 16889/20000: Accuracy = 0.6397
Epoch 16890/20000: Accuracy = 0.5662
Epoch 16891/20000: Accuracy = 0.4338
Epoch 16892/20000: Accuracy = 0.5368
Epoch 16893/20000: Accuracy = 0.4191
Epoch 16894/20000: Accuracy = 0.4191
Epoch 16895/20000: Accuracy = 0.6250
Epoch 16896/20000: Accuracy = 0.5956
Epoch 16897/20000: Accuracy = 0.6176
Epoch 16898/20000: Accuracy = 0.6029
Epoch 16899/20000: Accuracy = 0.4118
Epoch 16900/20000: Accuracy = 0.3750
Epoch 16901/20000: Accuracy = 0.7059
Epoch 16902/20000: Accuracy = 0.6250
Epoch 16903/20000: Accuracy = 0.4412
Epoch 16904/20000: Accuracy = 0.6250
```

```
Epoch 16905/20000: Accuracy = 0.3824
Epoch 16906/20000: Accuracy = 0.6324
Epoch 16907/20000: Accuracy = 0.6029
Epoch 16908/20000: Accuracy = 0.3603
Epoch 16909/20000: Accuracy = 0.4191
Epoch 16910/20000: Accuracy = 0.6176
Epoch 16911/20000: Accuracy = 0.3971
Epoch 16912/20000: Accuracy = 0.5147
Epoch 16913/20000: Accuracy = 0.3824
Epoch 16914/20000: Accuracy = 0.4706
Epoch 16915/20000: Accuracy = 0.6250
Epoch 16916/20000: Accuracy = 0.6176
Epoch 16917/20000: Accuracy = 0.3824
Epoch 16918/20000: Accuracy = 0.3824
Epoch 16919/20000: Accuracy = 0.4779
Epoch 16920/20000: Accuracy = 0.3603
Epoch 16921/20000: Accuracy = 0.5074
Epoch 16922/20000: Accuracy = 0.3750
Epoch 16923/20000: Accuracy = 0.6176
Epoch 16924/20000: Accuracy = 0.6324
Epoch 16925/20000: Accuracy = 0.3750
Epoch 16926/20000: Accuracy = 0.6250
Epoch 16927/20000: Accuracy = 0.3676
Epoch 16928/20000: Accuracy = 0.5956
Epoch 16929/20000: Accuracy = 0.2794
Epoch 16930/20000: Accuracy = 0.3897
Epoch 16931/20000: Accuracy = 0.3162
Epoch 16932/20000: Accuracy = 0.6324
Epoch 16933/20000: Accuracy = 0.3750
Epoch 16934/20000: Accuracy = 0.3676
Epoch 16935/20000: Accuracy = 0.4412
Epoch 16936/20000: Accuracy = 0.6103
Epoch 16937/20000: Accuracy = 0.3897
Epoch 16938/20000: Accuracy = 0.3824
Epoch 16939/20000: Accuracy = 0.4338
Epoch 16940/20000: Accuracy = 0.3897
Epoch 16941/20000: Accuracy = 0.4044
Epoch 16942/20000: Accuracy = 0.3897
Epoch 16943/20000: Accuracy = 0.3750
Epoch 16944/20000: Accuracy = 0.3971
Epoch 16945/20000: Accuracy = 0.3824
Epoch 16946/20000: Accuracy = 0.3824
Epoch 16947/20000: Accuracy = 0.6176
Epoch 16948/20000: Accuracy = 0.3015
Epoch 16949/20000: Accuracy = 0.6691
Epoch 16950/20000: Accuracy = 0.4926
Epoch 16951/20000: Accuracy = 0.6838
Epoch 16952/20000: Accuracy = 0.6838
```

```
Epoch 16953/20000: Accuracy = 0.5735
Epoch 16954/20000: Accuracy = 0.6250
Epoch 16955/20000: Accuracy = 0.6103
Epoch 16956/20000: Accuracy = 0.4044
Epoch 16957/20000: Accuracy = 0.3750
Epoch 16958/20000: Accuracy = 0.5515
Epoch 16959/20000: Accuracy = 0.6176
Epoch 16960/20000: Accuracy = 0.4853
Epoch 16961/20000: Accuracy = 0.6250
Epoch 16962/20000: Accuracy = 0.4559
Epoch 16963/20000: Accuracy = 0.3897
Epoch 16964/20000: Accuracy = 0.4485
Epoch 16965/20000: Accuracy = 0.6250
Epoch 16966/20000: Accuracy = 0.4632
Epoch 16967/20000: Accuracy = 0.3824
Epoch 16968/20000: Accuracy = 0.3824
Epoch 16969/20000: Accuracy = 0.3971
Epoch 16970/20000: Accuracy = 0.3897
Epoch 16971/20000: Accuracy = 0.4926
Epoch 16972/20000: Accuracy = 0.3750
Epoch 16973/20000: Accuracy = 0.3824
Epoch 16974/20000: Accuracy = 0.6544
Epoch 16975/20000: Accuracy = 0.6176
Epoch 16976/20000: Accuracy = 0.6838
Epoch 16977/20000: Accuracy = 0.3750
Epoch 16978/20000: Accuracy = 0.3897
Epoch 16979/20000: Accuracy = 0.6618
Epoch 16980/20000: Accuracy = 0.5515
Epoch 16981/20000: Accuracy = 0.6250
Epoch 16982/20000: Accuracy = 0.3750
Epoch 16983/20000: Accuracy = 0.4559
Epoch 16984/20000: Accuracy = 0.3824
Epoch 16985/20000: Accuracy = 0.6397
Epoch 16986/20000: Accuracy = 0.6250
Epoch 16987/20000: Accuracy = 0.6250
Epoch 16988/20000: Accuracy = 0.3897
Epoch 16989/20000: Accuracy = 0.3897
Epoch 16990/20000: Accuracy = 0.3676
Epoch 16991/20000: Accuracy = 0.5956
Epoch 16992/20000: Accuracy = 0.3897
Epoch 16993/20000: Accuracy = 0.3750
Epoch 16994/20000: Accuracy = 0.3897
Epoch 16995/20000: Accuracy = 0.3235
Epoch 16996/20000: Accuracy = 0.6103
Epoch 16997/20000: Accuracy = 0.6250
Epoch 16998/20000: Accuracy = 0.3309
Epoch 16999/20000: Accuracy = 0.3750
Epoch 17000/20000: Accuracy = 0.5882
```

```
Epoch 17001/20000: Accuracy = 0.6176
Epoch 17002/20000: Accuracy = 0.4412
Epoch 17003/20000: Accuracy = 0.5956
Epoch 17004/20000: Accuracy = 0.6103
Epoch 17005/20000: Accuracy = 0.3750
Epoch 17006/20000: Accuracy = 0.6250
Epoch 17007/20000: Accuracy = 0.5588
Epoch 17008/20000: Accuracy = 0.6103
Epoch 17009/20000: Accuracy = 0.5000
Epoch 17010/20000: Accuracy = 0.3750
Epoch 17011/20000: Accuracy = 0.6250
Epoch 17012/20000: Accuracy = 0.6250
Epoch 17013/20000: Accuracy = 0.3971
Epoch 17014/20000: Accuracy = 0.6176
Epoch 17015/20000: Accuracy = 0.3971
Epoch 17016/20000: Accuracy = 0.4559
Epoch 17017/20000: Accuracy = 0.3971
Epoch 17018/20000: Accuracy = 0.5294
Epoch 17019/20000: Accuracy = 0.3971
Epoch 17020/20000: Accuracy = 0.4485
Epoch 17021/20000: Accuracy = 0.3750
Epoch 17022/20000: Accuracy = 0.6029
Epoch 17023/20000: Accuracy = 0.3750
Epoch 17024/20000: Accuracy = 0.4118
Epoch 17025/20000: Accuracy = 0.5882
Epoch 17026/20000: Accuracy = 0.6250
Epoch 17027/20000: Accuracy = 0.3824
Epoch 17028/20000: Accuracy = 0.6324
Epoch 17029/20000: Accuracy = 0.4044
Epoch 17030/20000: Accuracy = 0.5662
Epoch 17031/20000: Accuracy = 0.6176
Epoch 17032/20000: Accuracy = 0.3897
Epoch 17033/20000: Accuracy = 0.6250
Epoch 17034/20000: Accuracy = 0.5956
Epoch 17035/20000: Accuracy = 0.3750
Epoch 17036/20000: Accuracy = 0.6324
Epoch 17037/20000: Accuracy = 0.4265
Epoch 17038/20000: Accuracy = 0.6324
Epoch 17039/20000: Accuracy = 0.3824
Epoch 17040/20000: Accuracy = 0.6544
Epoch 17041/20000: Accuracy = 0.3750
Epoch 17042/20000: Accuracy = 0.3676
Epoch 17043/20000: Accuracy = 0.6176
Epoch 17044/20000: Accuracy = 0.6250
Epoch 17045/20000: Accuracy = 0.3382
Epoch 17046/20000: Accuracy = 0.3750
Epoch 17047/20000: Accuracy = 0.5221
Epoch 17048/20000: Accuracy = 0.3824
```

```
Epoch 17049/20000: Accuracy = 0.6103
Epoch 17050/20000: Accuracy = 0.6103
Epoch 17051/20000: Accuracy = 0.6103
Epoch 17052/20000: Accuracy = 0.6250
Epoch 17053/20000: Accuracy = 0.3750
Epoch 17054/20000: Accuracy = 0.3824
Epoch 17055/20000: Accuracy = 0.4191
Epoch 17056/20000: Accuracy = 0.6103
Epoch 17057/20000: Accuracy = 0.6324
Epoch 17058/20000: Accuracy = 0.4338
Epoch 17059/20000: Accuracy = 0.3971
Epoch 17060/20000: Accuracy = 0.5074
Epoch 17061/20000: Accuracy = 0.3750
Epoch 17062/20000: Accuracy = 0.4191
Epoch 17063/20000: Accuracy = 0.6103
Epoch 17064/20000: Accuracy = 0.3382
Epoch 17065/20000: Accuracy = 0.4338
Epoch 17066/20000: Accuracy = 0.3750
Epoch 17067/20000: Accuracy = 0.5588
Epoch 17068/20000: Accuracy = 0.4265
Epoch 17069/20000: Accuracy = 0.6103
Epoch 17070/20000: Accuracy = 0.5956
Epoch 17071/20000: Accuracy = 0.6250
Epoch 17072/20000: Accuracy = 0.3971
Epoch 17073/20000: Accuracy = 0.5588
Epoch 17074/20000: Accuracy = 0.6250
Epoch 17075/20000: Accuracy = 0.6618
Epoch 17076/20000: Accuracy = 0.6176
Epoch 17077/20000: Accuracy = 0.3897
Epoch 17078/20000: Accuracy = 0.4926
Epoch 17079/20000: Accuracy = 0.3971
Epoch 17080/20000: Accuracy = 0.3750
Epoch 17081/20000: Accuracy = 0.4485
Epoch 17082/20000: Accuracy = 0.6176
Epoch 17083/20000: Accuracy = 0.6250
Epoch 17084/20000: Accuracy = 0.6103
Epoch 17085/20000: Accuracy = 0.6250
Epoch 17086/20000: Accuracy = 0.6250
Epoch 17087/20000: Accuracy = 0.5735
Epoch 17088/20000: Accuracy = 0.2794
Epoch 17089/20000: Accuracy = 0.6838
Epoch 17090/20000: Accuracy = 0.6103
Epoch 17091/20000: Accuracy = 0.4706
Epoch 17092/20000: Accuracy = 0.3603
Epoch 17093/20000: Accuracy = 0.3750
Epoch 17094/20000: Accuracy = 0.3971
Epoch 17095/20000: Accuracy = 0.3971
Epoch 17096/20000: Accuracy = 0.5147
```

```
Epoch 17097/20000: Accuracy = 0.6250
Epoch 17098/20000: Accuracy = 0.6324
Epoch 17099/20000: Accuracy = 0.3971
Epoch 17100/20000: Accuracy = 0.5956
Epoch 17101/20000: Accuracy = 0.3824
Epoch 17102/20000: Accuracy = 0.6324
Epoch 17103/20000: Accuracy = 0.6250
Epoch 17104/20000: Accuracy = 0.3309
Epoch 17105/20000: Accuracy = 0.6324
Epoch 17106/20000: Accuracy = 0.5221
Epoch 17107/20000: Accuracy = 0.6103
Epoch 17108/20000: Accuracy = 0.3750
Epoch 17109/20000: Accuracy = 0.3382
Epoch 17110/20000: Accuracy = 0.6250
Epoch 17111/20000: Accuracy = 0.6029
Epoch 17112/20000: Accuracy = 0.3676
Epoch 17113/20000: Accuracy = 0.6103
Epoch 17114/20000: Accuracy = 0.4118
Epoch 17115/20000: Accuracy = 0.6103
Epoch 17116/20000: Accuracy = 0.6176
Epoch 17117/20000: Accuracy = 0.6691
Epoch 17118/20000: Accuracy = 0.6250
Epoch 17119/20000: Accuracy = 0.3971
Epoch 17120/20000: Accuracy = 0.3897
Epoch 17121/20000: Accuracy = 0.3824
Epoch 17122/20000: Accuracy = 0.5588
Epoch 17123/20000: Accuracy = 0.3603
Epoch 17124/20000: Accuracy = 0.3750
Epoch 17125/20000: Accuracy = 0.5809
Epoch 17126/20000: Accuracy = 0.3824
Epoch 17127/20000: Accuracy = 0.6250
Epoch 17128/20000: Accuracy = 0.4853
Epoch 17129/20000: Accuracy = 0.6250
Epoch 17130/20000: Accuracy = 0.5956
Epoch 17131/20000: Accuracy = 0.4044
Epoch 17132/20000: Accuracy = 0.3750
Epoch 17133/20000: Accuracy = 0.5074
Epoch 17134/20000: Accuracy = 0.6103
Epoch 17135/20000: Accuracy = 0.3750
Epoch 17136/20000: Accuracy = 0.5221
Epoch 17137/20000: Accuracy = 0.7353
Epoch 17138/20000: Accuracy = 0.5221
Epoch 17139/20000: Accuracy = 0.6103
Epoch 17140/20000: Accuracy = 0.3824
Epoch 17141/20000: Accuracy = 0.5000
Epoch 17142/20000: Accuracy = 0.4779
Epoch 17143/20000: Accuracy = 0.6250
Epoch 17144/20000: Accuracy = 0.6618
```

```
Epoch 17145/20000: Accuracy = 0.6103
Epoch 17146/20000: Accuracy = 0.3897
Epoch 17147/20000: Accuracy = 0.3971
Epoch 17148/20000: Accuracy = 0.6250
Epoch 17149/20000: Accuracy = 0.6250
Epoch 17150/20000: Accuracy = 0.5441
Epoch 17151/20000: Accuracy = 0.3750
Epoch 17152/20000: Accuracy = 0.5956
Epoch 17153/20000: Accuracy = 0.3824
Epoch 17154/20000: Accuracy = 0.6250
Epoch 17155/20000: Accuracy = 0.3897
Epoch 17156/20000: Accuracy = 0.4044
Epoch 17157/20000: Accuracy = 0.5956
Epoch 17158/20000: Accuracy = 0.6765
Epoch 17159/20000: Accuracy = 0.6103
Epoch 17160/20000: Accuracy = 0.3235
Epoch 17161/20000: Accuracy = 0.6250
Epoch 17162/20000: Accuracy = 0.3676
Epoch 17163/20000: Accuracy = 0.5809
Epoch 17164/20000: Accuracy = 0.3750
Epoch 17165/20000: Accuracy = 0.3824
Epoch 17166/20000: Accuracy = 0.6029
Epoch 17167/20000: Accuracy = 0.6250
Epoch 17168/20000: Accuracy = 0.6029
Epoch 17169/20000: Accuracy = 0.6103
Epoch 17170/20000: Accuracy = 0.3971
Epoch 17171/20000: Accuracy = 0.4559
Epoch 17172/20000: Accuracy = 0.3456
Epoch 17173/20000: Accuracy = 0.4559
Epoch 17174/20000: Accuracy = 0.3750
Epoch 17175/20000: Accuracy = 0.3750
Epoch 17176/20000: Accuracy = 0.5515
Epoch 17177/20000: Accuracy = 0.6324
Epoch 17178/20000: Accuracy = 0.5882
Epoch 17179/20000: Accuracy = 0.3897
Epoch 17180/20000: Accuracy = 0.6250
Epoch 17181/20000: Accuracy = 0.5956
Epoch 17182/20000: Accuracy = 0.5735
Epoch 17183/20000: Accuracy = 0.6176
Epoch 17184/20000: Accuracy = 0.4044
Epoch 17185/20000: Accuracy = 0.6103
Epoch 17186/20000: Accuracy = 0.5368
Epoch 17187/20000: Accuracy = 0.4044
Epoch 17188/20000: Accuracy = 0.4853
Epoch 17189/20000: Accuracy = 0.3824
Epoch 17190/20000: Accuracy = 0.3676
Epoch 17191/20000: Accuracy = 0.3824
Epoch 17192/20000: Accuracy = 0.6250
```

```
Epoch 17193/20000: Accuracy = 0.3750
Epoch 17194/20000: Accuracy = 0.5147
Epoch 17195/20000: Accuracy = 0.6397
Epoch 17196/20000: Accuracy = 0.6324
Epoch 17197/20000: Accuracy = 0.5809
Epoch 17198/20000: Accuracy = 0.3750
Epoch 17199/20000: Accuracy = 0.6176
Epoch 17200/20000: Accuracy = 0.3971
Epoch 17201/20000: Accuracy = 0.5956
Epoch 17202/20000: Accuracy = 0.6176
Epoch 17203/20000: Accuracy = 0.5956
Epoch 17204/20000: Accuracy = 0.5809
Epoch 17205/20000: Accuracy = 0.3897
Epoch 17206/20000: Accuracy = 0.6250
Epoch 17207/20000: Accuracy = 0.3750
Epoch 17208/20000: Accuracy = 0.3603
Epoch 17209/20000: Accuracy = 0.4926
Epoch 17210/20000: Accuracy = 0.3750
Epoch 17211/20000: Accuracy = 0.6324
Epoch 17212/20000: Accuracy = 0.5956
Epoch 17213/20000: Accuracy = 0.7206
Epoch 17214/20000: Accuracy = 0.6397
Epoch 17215/20000: Accuracy = 0.3162
Epoch 17216/20000: Accuracy = 0.6029
Epoch 17217/20000: Accuracy = 0.5882
Epoch 17218/20000: Accuracy = 0.3824
Epoch 17219/20000: Accuracy = 0.3456
Epoch 17220/20000: Accuracy = 0.6397
Epoch 17221/20000: Accuracy = 0.6176
Epoch 17222/20000: Accuracy = 0.4265
Epoch 17223/20000: Accuracy = 0.6250
Epoch 17224/20000: Accuracy = 0.3750
Epoch 17225/20000: Accuracy = 0.5588
Epoch 17226/20000: Accuracy = 0.3971
Epoch 17227/20000: Accuracy = 0.6324
Epoch 17228/20000: Accuracy = 0.4191
Epoch 17229/20000: Accuracy = 0.4853
Epoch 17230/20000: Accuracy = 0.5515
Epoch 17231/20000: Accuracy = 0.5735
Epoch 17232/20000: Accuracy = 0.5662
Epoch 17233/20000: Accuracy = 0.5882
Epoch 17234/20000: Accuracy = 0.5368
Epoch 17235/20000: Accuracy = 0.6691
Epoch 17236/20000: Accuracy = 0.3897
Epoch 17237/20000: Accuracy = 0.6618
Epoch 17238/20000: Accuracy = 0.5882
Epoch 17239/20000: Accuracy = 0.3897
Epoch 17240/20000: Accuracy = 0.3897
```

```
Epoch 17241/20000: Accuracy = 0.4044
Epoch 17242/20000: Accuracy = 0.5074
Epoch 17243/20000: Accuracy = 0.3824
Epoch 17244/20000: Accuracy = 0.3676
Epoch 17245/20000: Accuracy = 0.6103
Epoch 17246/20000: Accuracy = 0.4044
Epoch 17247/20000: Accuracy = 0.3824
Epoch 17248/20000: Accuracy = 0.6250
Epoch 17249/20000: Accuracy = 0.4044
Epoch 17250/20000: Accuracy = 0.3897
Epoch 17251/20000: Accuracy = 0.4265
Epoch 17252/20000: Accuracy = 0.4926
Epoch 17253/20000: Accuracy = 0.6324
Epoch 17254/20000: Accuracy = 0.3971
Epoch 17255/20000: Accuracy = 0.4118
Epoch 17256/20000: Accuracy = 0.6176
Epoch 17257/20000: Accuracy = 0.5368
Epoch 17258/20000: Accuracy = 0.4485
Epoch 17259/20000: Accuracy = 0.6838
Epoch 17260/20000: Accuracy = 0.3824
Epoch 17261/20000: Accuracy = 0.5735
Epoch 17262/20000: Accuracy = 0.6250
Epoch 17263/20000: Accuracy = 0.6103
Epoch 17264/20000: Accuracy = 0.4338
Epoch 17265/20000: Accuracy = 0.4191
Epoch 17266/20000: Accuracy = 0.3676
Epoch 17267/20000: Accuracy = 0.3824
Epoch 17268/20000: Accuracy = 0.4118
Epoch 17269/20000: Accuracy = 0.5809
Epoch 17270/20000: Accuracy = 0.6250
Epoch 17271/20000: Accuracy = 0.6176
Epoch 17272/20000: Accuracy = 0.6912
Epoch 17273/20000: Accuracy = 0.4338
Epoch 17274/20000: Accuracy = 0.6324
Epoch 17275/20000: Accuracy = 0.6324
Epoch 17276/20000: Accuracy = 0.5882
Epoch 17277/20000: Accuracy = 0.6250
Epoch 17278/20000: Accuracy = 0.6103
Epoch 17279/20000: Accuracy = 0.5294
Epoch 17280/20000: Accuracy = 0.6250
Epoch 17281/20000: Accuracy = 0.3824
Epoch 17282/20000: Accuracy = 0.5294
Epoch 17283/20000: Accuracy = 0.4706
Epoch 17284/20000: Accuracy = 0.4118
Epoch 17285/20000: Accuracy = 0.3971
Epoch 17286/20000: Accuracy = 0.4412
Epoch 17287/20000: Accuracy = 0.3750
Epoch 17288/20000: Accuracy = 0.4559
```

```
Epoch 17289/20000: Accuracy = 0.3750
Epoch 17290/20000: Accuracy = 0.4044
Epoch 17291/20000: Accuracy = 0.6103
Epoch 17292/20000: Accuracy = 0.6176
Epoch 17293/20000: Accuracy = 0.6176
Epoch 17294/20000: Accuracy = 0.6250
Epoch 17295/20000: Accuracy = 0.6029
Epoch 17296/20000: Accuracy = 0.5882
Epoch 17297/20000: Accuracy = 0.3897
Epoch 17298/20000: Accuracy = 0.6324
Epoch 17299/20000: Accuracy = 0.5956
Epoch 17300/20000: Accuracy = 0.4412
Epoch 17301/20000: Accuracy = 0.6250
Epoch 17302/20000: Accuracy = 0.4118
Epoch 17303/20000: Accuracy = 0.3750
Epoch 17304/20000: Accuracy = 0.3750
Epoch 17305/20000: Accuracy = 0.6250
Epoch 17306/20000: Accuracy = 0.3603
Epoch 17307/20000: Accuracy = 0.4338
Epoch 17308/20000: Accuracy = 0.3824
Epoch 17309/20000: Accuracy = 0.4412
Epoch 17310/20000: Accuracy = 0.6250
Epoch 17311/20000: Accuracy = 0.4118
Epoch 17312/20000: Accuracy = 0.3824
Epoch 17313/20000: Accuracy = 0.4191
Epoch 17314/20000: Accuracy = 0.6250
Epoch 17315/20000: Accuracy = 0.5809
Epoch 17316/20000: Accuracy = 0.3603
Epoch 17317/20000: Accuracy = 0.3971
Epoch 17318/20000: Accuracy = 0.6103
Epoch 17319/20000: Accuracy = 0.4265
Epoch 17320/20000: Accuracy = 0.3750
Epoch 17321/20000: Accuracy = 0.3603
Epoch 17322/20000: Accuracy = 0.5882
Epoch 17323/20000: Accuracy = 0.3750
Epoch 17324/20000: Accuracy = 0.5735
Epoch 17325/20000: Accuracy = 0.6250
Epoch 17326/20000: Accuracy = 0.3824
Epoch 17327/20000: Accuracy = 0.3897
Epoch 17328/20000: Accuracy = 0.3897
Epoch 17329/20000: Accuracy = 0.5809
Epoch 17330/20000: Accuracy = 0.5074
Epoch 17331/20000: Accuracy = 0.2868
Epoch 17332/20000: Accuracy = 0.3750
Epoch 17333/20000: Accuracy = 0.3603
Epoch 17334/20000: Accuracy = 0.4338
Epoch 17335/20000: Accuracy = 0.6103
Epoch 17336/20000: Accuracy = 0.3824
```

```
Epoch 17337/20000: Accuracy = 0.6103
Epoch 17338/20000: Accuracy = 0.6176
Epoch 17339/20000: Accuracy = 0.4485
Epoch 17340/20000: Accuracy = 0.4044
Epoch 17341/20000: Accuracy = 0.6176
Epoch 17342/20000: Accuracy = 0.5956
Epoch 17343/20000: Accuracy = 0.3750
Epoch 17344/20000: Accuracy = 0.3750
Epoch 17345/20000: Accuracy = 0.5662
Epoch 17346/20000: Accuracy = 0.4779
Epoch 17347/20000: Accuracy = 0.3750
Epoch 17348/20000: Accuracy = 0.5515
Epoch 17349/20000: Accuracy = 0.6103
Epoch 17350/20000: Accuracy = 0.3456
Epoch 17351/20000: Accuracy = 0.6618
Epoch 17352/20000: Accuracy = 0.4412
Epoch 17353/20000: Accuracy = 0.4118
Epoch 17354/20000: Accuracy = 0.3750
Epoch 17355/20000: Accuracy = 0.3750
Epoch 17356/20000: Accuracy = 0.6250
Epoch 17357/20000: Accuracy = 0.3750
Epoch 17358/20000: Accuracy = 0.4779
Epoch 17359/20000: Accuracy = 0.4044
Epoch 17360/20000: Accuracy = 0.5956
Epoch 17361/20000: Accuracy = 0.5956
Epoch 17362/20000: Accuracy = 0.6250
Epoch 17363/20000: Accuracy = 0.5882
Epoch 17364/20000: Accuracy = 0.4191
Epoch 17365/20000: Accuracy = 0.5956
Epoch 17366/20000: Accuracy = 0.3824
Epoch 17367/20000: Accuracy = 0.6618
Epoch 17368/20000: Accuracy = 0.6029
Epoch 17369/20000: Accuracy = 0.5735
Epoch 17370/20000: Accuracy = 0.6250
Epoch 17371/20000: Accuracy = 0.3971
Epoch 17372/20000: Accuracy = 0.6250
Epoch 17373/20000: Accuracy = 0.6250
Epoch 17374/20000: Accuracy = 0.5662
Epoch 17375/20000: Accuracy = 0.5662
Epoch 17376/20000: Accuracy = 0.4559
Epoch 17377/20000: Accuracy = 0.6176
Epoch 17378/20000: Accuracy = 0.5588
Epoch 17379/20000: Accuracy = 0.3750
Epoch 17380/20000: Accuracy = 0.3088
Epoch 17381/20000: Accuracy = 0.6176
Epoch 17382/20000: Accuracy = 0.5147
Epoch 17383/20000: Accuracy = 0.5735
Epoch 17384/20000: Accuracy = 0.6471
```

```
Epoch 17385/20000: Accuracy = 0.3971
Epoch 17386/20000: Accuracy = 0.5221
Epoch 17387/20000: Accuracy = 0.3750
Epoch 17388/20000: Accuracy = 0.6103
Epoch 17389/20000: Accuracy = 0.5735
Epoch 17390/20000: Accuracy = 0.6103
Epoch 17391/20000: Accuracy = 0.3603
Epoch 17392/20000: Accuracy = 0.5441
Epoch 17393/20000: Accuracy = 0.6324
Epoch 17394/20000: Accuracy = 0.3529
Epoch 17395/20000: Accuracy = 0.3824
Epoch 17396/20000: Accuracy = 0.6250
Epoch 17397/20000: Accuracy = 0.6765
Epoch 17398/20000: Accuracy = 0.3824
Epoch 17399/20000: Accuracy = 0.6250
Epoch 17400/20000: Accuracy = 0.3750
Epoch 17401/20000: Accuracy = 0.6176
Epoch 17402/20000: Accuracy = 0.6765
Epoch 17403/20000: Accuracy = 0.5515
Epoch 17404/20000: Accuracy = 0.5074
Epoch 17405/20000: Accuracy = 0.3235
Epoch 17406/20000: Accuracy = 0.4412
Epoch 17407/20000: Accuracy = 0.6250
Epoch 17408/20000: Accuracy = 0.4118
Epoch 17409/20000: Accuracy = 0.6029
Epoch 17410/20000: Accuracy = 0.6176
Epoch 17411/20000: Accuracy = 0.6250
Epoch 17412/20000: Accuracy = 0.6250
Epoch 17413/20000: Accuracy = 0.5441
Epoch 17414/20000: Accuracy = 0.3750
Epoch 17415/20000: Accuracy = 0.3824
Epoch 17416/20000: Accuracy = 0.3824
Epoch 17417/20000: Accuracy = 0.7426
Epoch 17418/20000: Accuracy = 0.6250
Epoch 17419/20000: Accuracy = 0.5221
Epoch 17420/20000: Accuracy = 0.6250
Epoch 17421/20000: Accuracy = 0.6176
Epoch 17422/20000: Accuracy = 0.3309
Epoch 17423/20000: Accuracy = 0.6103
Epoch 17424/20000: Accuracy = 0.3824
Epoch 17425/20000: Accuracy = 0.6250
Epoch 17426/20000: Accuracy = 0.5368
Epoch 17427/20000: Accuracy = 0.5882
Epoch 17428/20000: Accuracy = 0.3824
Epoch 17429/20000: Accuracy = 0.6176
Epoch 17430/20000: Accuracy = 0.4412
Epoch 17431/20000: Accuracy = 0.3750
Epoch 17432/20000: Accuracy = 0.6250
```

```
Epoch 17433/20000: Accuracy = 0.6250
Epoch 17434/20000: Accuracy = 0.5515
Epoch 17435/20000: Accuracy = 0.3603
Epoch 17436/20000: Accuracy = 0.6250
Epoch 17437/20000: Accuracy = 0.3015
Epoch 17438/20000: Accuracy = 0.6029
Epoch 17439/20000: Accuracy = 0.3456
Epoch 17440/20000: Accuracy = 0.6250
Epoch 17441/20000: Accuracy = 0.6838
Epoch 17442/20000: Accuracy = 0.6250
Epoch 17443/20000: Accuracy = 0.7059
Epoch 17444/20000: Accuracy = 0.6176
Epoch 17445/20000: Accuracy = 0.3750
Epoch 17446/20000: Accuracy = 0.3897
Epoch 17447/20000: Accuracy = 0.6029
Epoch 17448/20000: Accuracy = 0.5368
Epoch 17449/20000: Accuracy = 0.6250
Epoch 17450/20000: Accuracy = 0.6103
Epoch 17451/20000: Accuracy = 0.6176
Epoch 17452/20000: Accuracy = 0.4338
Epoch 17453/20000: Accuracy = 0.4706
Epoch 17454/20000: Accuracy = 0.3971
Epoch 17455/20000: Accuracy = 0.4485
Epoch 17456/20000: Accuracy = 0.6324
Epoch 17457/20000: Accuracy = 0.6176
Epoch 17458/20000: Accuracy = 0.3750
Epoch 17459/20000: Accuracy = 0.4926
Epoch 17460/20000: Accuracy = 0.6176
Epoch 17461/20000: Accuracy = 0.3750
Epoch 17462/20000: Accuracy = 0.3750
Epoch 17463/20000: Accuracy = 0.3824
Epoch 17464/20000: Accuracy = 0.3897
Epoch 17465/20000: Accuracy = 0.6176
Epoch 17466/20000: Accuracy = 0.6324
Epoch 17467/20000: Accuracy = 0.5515
Epoch 17468/20000: Accuracy = 0.6176
Epoch 17469/20000: Accuracy = 0.3824
Epoch 17470/20000: Accuracy = 0.6324
Epoch 17471/20000: Accuracy = 0.6250
Epoch 17472/20000: Accuracy = 0.6250
Epoch 17473/20000: Accuracy = 0.6250
Epoch 17474/20000: Accuracy = 0.3750
Epoch 17475/20000: Accuracy = 0.6176
Epoch 17476/20000: Accuracy = 0.6250
Epoch 17477/20000: Accuracy = 0.3676
Epoch 17478/20000: Accuracy = 0.3529
Epoch 17479/20000: Accuracy = 0.3750
Epoch 17480/20000: Accuracy = 0.6912
```

```
Epoch 17481/20000: Accuracy = 0.4559
Epoch 17482/20000: Accuracy = 0.3235
Epoch 17483/20000: Accuracy = 0.6029
Epoch 17484/20000: Accuracy = 0.6176
Epoch 17485/20000: Accuracy = 0.3750
Epoch 17486/20000: Accuracy = 0.4559
Epoch 17487/20000: Accuracy = 0.6029
Epoch 17488/20000: Accuracy = 0.6176
Epoch 17489/20000: Accuracy = 0.3750
Epoch 17490/20000: Accuracy = 0.3529
Epoch 17491/20000: Accuracy = 0.4485
Epoch 17492/20000: Accuracy = 0.6176
Epoch 17493/20000: Accuracy = 0.6250
Epoch 17494/20000: Accuracy = 0.4044
Epoch 17495/20000: Accuracy = 0.3750
Epoch 17496/20000: Accuracy = 0.3529
Epoch 17497/20000: Accuracy = 0.3750
Epoch 17498/20000: Accuracy = 0.6176
Epoch 17499/20000: Accuracy = 0.4412
Epoch 17500/20000: Accuracy = 0.6691
Epoch 17501/20000: Accuracy = 0.3603
Epoch 17502/20000: Accuracy = 0.6029
Epoch 17503/20000: Accuracy = 0.3750
Epoch 17504/20000: Accuracy = 0.6103
Epoch 17505/20000: Accuracy = 0.6250
Epoch 17506/20000: Accuracy = 0.5956
Epoch 17507/20000: Accuracy = 0.6176
Epoch 17508/20000: Accuracy = 0.3971
Epoch 17509/20000: Accuracy = 0.4191
Epoch 17510/20000: Accuracy = 0.6103
Epoch 17511/20000: Accuracy = 0.4926
Epoch 17512/20000: Accuracy = 0.3676
Epoch 17513/20000: Accuracy = 0.3971
Epoch 17514/20000: Accuracy = 0.3750
Epoch 17515/20000: Accuracy = 0.3971
Epoch 17516/20000: Accuracy = 0.4559
Epoch 17517/20000: Accuracy = 0.5735
Epoch 17518/20000: Accuracy = 0.6250
Epoch 17519/20000: Accuracy = 0.3529
Epoch 17520/20000: Accuracy = 0.3750
Epoch 17521/20000: Accuracy = 0.3382
Epoch 17522/20000: Accuracy = 0.5735
Epoch 17523/20000: Accuracy = 0.4265
Epoch 17524/20000: Accuracy = 0.6029
Epoch 17525/20000: Accuracy = 0.6176
Epoch 17526/20000: Accuracy = 0.6250
Epoch 17527/20000: Accuracy = 0.3824
Epoch 17528/20000: Accuracy = 0.4044
```

```
Epoch 17529/20000: Accuracy = 0.3824
Epoch 17530/20000: Accuracy = 0.4706
Epoch 17531/20000: Accuracy = 0.5588
Epoch 17532/20000: Accuracy = 0.5662
Epoch 17533/20000: Accuracy = 0.3750
Epoch 17534/20000: Accuracy = 0.4118
Epoch 17535/20000: Accuracy = 0.5735
Epoch 17536/20000: Accuracy = 0.3676
Epoch 17537/20000: Accuracy = 0.6103
Epoch 17538/20000: Accuracy = 0.3824
Epoch 17539/20000: Accuracy = 0.7132
Epoch 17540/20000: Accuracy = 0.4044
Epoch 17541/20000: Accuracy = 0.3824
Epoch 17542/20000: Accuracy = 0.6397
Epoch 17543/20000: Accuracy = 0.5882
Epoch 17544/20000: Accuracy = 0.3750
Epoch 17545/20000: Accuracy = 0.6250
Epoch 17546/20000: Accuracy = 0.4338
Epoch 17547/20000: Accuracy = 0.4485
Epoch 17548/20000: Accuracy = 0.6397
Epoch 17549/20000: Accuracy = 0.6324
Epoch 17550/20000: Accuracy = 0.6250
Epoch 17551/20000: Accuracy = 0.4632
Epoch 17552/20000: Accuracy = 0.6103
Epoch 17553/20000: Accuracy = 0.5441
Epoch 17554/20000: Accuracy = 0.6618
Epoch 17555/20000: Accuracy = 0.6103
Epoch 17556/20000: Accuracy = 0.5956
Epoch 17557/20000: Accuracy = 0.5882
Epoch 17558/20000: Accuracy = 0.6176
Epoch 17559/20000: Accuracy = 0.6250
Epoch 17560/20000: Accuracy = 0.3824
Epoch 17561/20000: Accuracy = 0.4338
Epoch 17562/20000: Accuracy = 0.3897
Epoch 17563/20000: Accuracy = 0.4559
Epoch 17564/20000: Accuracy = 0.6103
Epoch 17565/20000: Accuracy = 0.4191
Epoch 17566/20000: Accuracy = 0.3676
Epoch 17567/20000: Accuracy = 0.3897
Epoch 17568/20000: Accuracy = 0.3750
Epoch 17569/20000: Accuracy = 0.6324
Epoch 17570/20000: Accuracy = 0.5735
Epoch 17571/20000: Accuracy = 0.6176
Epoch 17572/20000: Accuracy = 0.3750
Epoch 17573/20000: Accuracy = 0.6103
Epoch 17574/20000: Accuracy = 0.6176
Epoch 17575/20000: Accuracy = 0.6176
Epoch 17576/20000: Accuracy = 0.5956
```

```
Epoch 17577/20000: Accuracy = 0.6176
Epoch 17578/20000: Accuracy = 0.4559
Epoch 17579/20000: Accuracy = 0.6029
Epoch 17580/20000: Accuracy = 0.3824
Epoch 17581/20000: Accuracy = 0.6029
Epoch 17582/20000: Accuracy = 0.5735
Epoch 17583/20000: Accuracy = 0.4338
Epoch 17584/20000: Accuracy = 0.3750
Epoch 17585/20000: Accuracy = 0.6250
Epoch 17586/20000: Accuracy = 0.6838
Epoch 17587/20000: Accuracy = 0.5588
Epoch 17588/20000: Accuracy = 0.5735
Epoch 17589/20000: Accuracy = 0.6176
Epoch 17590/20000: Accuracy = 0.6176
Epoch 17591/20000: Accuracy = 0.3897
Epoch 17592/20000: Accuracy = 0.3750
Epoch 17593/20000: Accuracy = 0.6103
Epoch 17594/20000: Accuracy = 0.3824
Epoch 17595/20000: Accuracy = 0.6029
Epoch 17596/20000: Accuracy = 0.6029
Epoch 17597/20000: Accuracy = 0.6250
Epoch 17598/20000: Accuracy = 0.4265
Epoch 17599/20000: Accuracy = 0.3750
Epoch 17600/20000: Accuracy = 0.6250
Epoch 17601/20000: Accuracy = 0.6103
Epoch 17602/20000: Accuracy = 0.3824
Epoch 17603/20000: Accuracy = 0.3750
Epoch 17604/20000: Accuracy = 0.6250
Epoch 17605/20000: Accuracy = 0.6912
Epoch 17606/20000: Accuracy = 0.5956
Epoch 17607/20000: Accuracy = 0.3824
Epoch 17608/20000: Accuracy = 0.4559
Epoch 17609/20000: Accuracy = 0.3309
Epoch 17610/20000: Accuracy = 0.3971
Epoch 17611/20000: Accuracy = 0.4559
Epoch 17612/20000: Accuracy = 0.5735
Epoch 17613/20000: Accuracy = 0.4191
Epoch 17614/20000: Accuracy = 0.3750
Epoch 17615/20000: Accuracy = 0.3309
Epoch 17616/20000: Accuracy = 0.5000
Epoch 17617/20000: Accuracy = 0.6029
Epoch 17618/20000: Accuracy = 0.6250
Epoch 17619/20000: Accuracy = 0.3750
Epoch 17620/20000: Accuracy = 0.3676
Epoch 17621/20000: Accuracy = 0.4926
Epoch 17622/20000: Accuracy = 0.6250
Epoch 17623/20000: Accuracy = 0.3750
Epoch 17624/20000: Accuracy = 0.6250
```

```
Epoch 17625/20000: Accuracy = 0.6103
Epoch 17626/20000: Accuracy = 0.4412
Epoch 17627/20000: Accuracy = 0.6176
Epoch 17628/20000: Accuracy = 0.6397
Epoch 17629/20000: Accuracy = 0.6471
Epoch 17630/20000: Accuracy = 0.4632
Epoch 17631/20000: Accuracy = 0.6471
Epoch 17632/20000: Accuracy = 0.5956
Epoch 17633/20000: Accuracy = 0.5735
Epoch 17634/20000: Accuracy = 0.6250
Epoch 17635/20000: Accuracy = 0.3824
Epoch 17636/20000: Accuracy = 0.6250
Epoch 17637/20000: Accuracy = 0.6103
Epoch 17638/20000: Accuracy = 0.6103
Epoch 17639/20000: Accuracy = 0.6250
Epoch 17640/20000: Accuracy = 0.5882
Epoch 17641/20000: Accuracy = 0.6250
Epoch 17642/20000: Accuracy = 0.3897
Epoch 17643/20000: Accuracy = 0.6544
Epoch 17644/20000: Accuracy = 0.4632
Epoch 17645/20000: Accuracy = 0.3162
Epoch 17646/20000: Accuracy = 0.6250
Epoch 17647/20000: Accuracy = 0.6838
Epoch 17648/20000: Accuracy = 0.3824
Epoch 17649/20000: Accuracy = 0.5956
Epoch 17650/20000: Accuracy = 0.6544
Epoch 17651/20000: Accuracy = 0.4485
Epoch 17652/20000: Accuracy = 0.6103
Epoch 17653/20000: Accuracy = 0.4632
Epoch 17654/20000: Accuracy = 0.5441
Epoch 17655/20000: Accuracy = 0.6176
Epoch 17656/20000: Accuracy = 0.3897
Epoch 17657/20000: Accuracy = 0.3750
Epoch 17658/20000: Accuracy = 0.6250
Epoch 17659/20000: Accuracy = 0.6250
Epoch 17660/20000: Accuracy = 0.6029
Epoch 17661/20000: Accuracy = 0.6103
Epoch 17662/20000: Accuracy = 0.6029
Epoch 17663/20000: Accuracy = 0.6103
Epoch 17664/20000: Accuracy = 0.3824
Epoch 17665/20000: Accuracy = 0.5000
Epoch 17666/20000: Accuracy = 0.3750
Epoch 17667/20000: Accuracy = 0.6103
Epoch 17668/20000: Accuracy = 0.7132
Epoch 17669/20000: Accuracy = 0.4338
Epoch 17670/20000: Accuracy = 0.6103
Epoch 17671/20000: Accuracy = 0.3603
Epoch 17672/20000: Accuracy = 0.4926
```

```
Epoch 17673/20000: Accuracy = 0.3750
Epoch 17674/20000: Accuracy = 0.3897
Epoch 17675/20000: Accuracy = 0.6250
Epoch 17676/20000: Accuracy = 0.3750
Epoch 17677/20000: Accuracy = 0.3897
Epoch 17678/20000: Accuracy = 0.4118
Epoch 17679/20000: Accuracy = 0.4706
Epoch 17680/20000: Accuracy = 0.6765
Epoch 17681/20000: Accuracy = 0.6250
Epoch 17682/20000: Accuracy = 0.5221
Epoch 17683/20000: Accuracy = 0.6176
Epoch 17684/20000: Accuracy = 0.3750
Epoch 17685/20000: Accuracy = 0.3897
Epoch 17686/20000: Accuracy = 0.4559
Epoch 17687/20000: Accuracy = 0.3750
Epoch 17688/20000: Accuracy = 0.6618
Epoch 17689/20000: Accuracy = 0.4265
Epoch 17690/20000: Accuracy = 0.3750
Epoch 17691/20000: Accuracy = 0.6103
Epoch 17692/20000: Accuracy = 0.3529
Epoch 17693/20000: Accuracy = 0.6397
Epoch 17694/20000: Accuracy = 0.6250
Epoch 17695/20000: Accuracy = 0.3750
Epoch 17696/20000: Accuracy = 0.3971
Epoch 17697/20000: Accuracy = 0.5956
Epoch 17698/20000: Accuracy = 0.2721
Epoch 17699/20000: Accuracy = 0.6250
Epoch 17700/20000: Accuracy = 0.6250
Epoch 17701/20000: Accuracy = 0.6250
Epoch 17702/20000: Accuracy = 0.3603
Epoch 17703/20000: Accuracy = 0.6176
Epoch 17704/20000: Accuracy = 0.6176
Epoch 17705/20000: Accuracy = 0.3824
Epoch 17706/20000: Accuracy = 0.5735
Epoch 17707/20000: Accuracy = 0.3750
Epoch 17708/20000: Accuracy = 0.4044
Epoch 17709/20000: Accuracy = 0.5735
Epoch 17710/20000: Accuracy = 0.5000
Epoch 17711/20000: Accuracy = 0.6324
Epoch 17712/20000: Accuracy = 0.3750
Epoch 17713/20000: Accuracy = 0.3824
Epoch 17714/20000: Accuracy = 0.6250
Epoch 17715/20000: Accuracy = 0.6029
Epoch 17716/20000: Accuracy = 0.3824
Epoch 17717/20000: Accuracy = 0.6103
Epoch 17718/20000: Accuracy = 0.5368
Epoch 17719/20000: Accuracy = 0.5735
Epoch 17720/20000: Accuracy = 0.6324
```

```
Epoch 17721/20000: Accuracy = 0.4118
Epoch 17722/20000: Accuracy = 0.6250
Epoch 17723/20000: Accuracy = 0.6103
Epoch 17724/20000: Accuracy = 0.6029
Epoch 17725/20000: Accuracy = 0.6103
Epoch 17726/20000: Accuracy = 0.6103
Epoch 17727/20000: Accuracy = 0.3750
Epoch 17728/20000: Accuracy = 0.5882
Epoch 17729/20000: Accuracy = 0.4044
Epoch 17730/20000: Accuracy = 0.4632
Epoch 17731/20000: Accuracy = 0.6544
Epoch 17732/20000: Accuracy = 0.2941
Epoch 17733/20000: Accuracy = 0.5441
Epoch 17734/20000: Accuracy = 0.3750
Epoch 17735/20000: Accuracy = 0.3750
Epoch 17736/20000: Accuracy = 0.3897
Epoch 17737/20000: Accuracy = 0.6397
Epoch 17738/20000: Accuracy = 0.5882
Epoch 17739/20000: Accuracy = 0.6250
Epoch 17740/20000: Accuracy = 0.3382
Epoch 17741/20000: Accuracy = 0.4118
Epoch 17742/20000: Accuracy = 0.3824
Epoch 17743/20000: Accuracy = 0.6250
Epoch 17744/20000: Accuracy = 0.6103
Epoch 17745/20000: Accuracy = 0.5735
Epoch 17746/20000: Accuracy = 0.3750
Epoch 17747/20000: Accuracy = 0.5809
Epoch 17748/20000: Accuracy = 0.3824
Epoch 17749/20000: Accuracy = 0.4044
Epoch 17750/20000: Accuracy = 0.6176
Epoch 17751/20000: Accuracy = 0.3750
Epoch 17752/20000: Accuracy = 0.3897
Epoch 17753/20000: Accuracy = 0.5147
Epoch 17754/20000: Accuracy = 0.6176
Epoch 17755/20000: Accuracy = 0.5956
Epoch 17756/20000: Accuracy = 0.6250
Epoch 17757/20000: Accuracy = 0.3824
Epoch 17758/20000: Accuracy = 0.5956
Epoch 17759/20000: Accuracy = 0.2574
Epoch 17760/20000: Accuracy = 0.3750
Epoch 17761/20000: Accuracy = 0.4485
Epoch 17762/20000: Accuracy = 0.3750
Epoch 17763/20000: Accuracy = 0.6176
Epoch 17764/20000: Accuracy = 0.4191
Epoch 17765/20000: Accuracy = 0.6250
Epoch 17766/20000: Accuracy = 0.6029
Epoch 17767/20000: Accuracy = 0.6103
Epoch 17768/20000: Accuracy = 0.6250
```

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Epoch 17769/20000: Accuracy = 0.3971
Epoch 17770/20000: Accuracy = 0.5441
Epoch 17771/20000: Accuracy = 0.3603
Epoch 17772/20000: Accuracy = 0.6103
Epoch 17773/20000: Accuracy = 0.3750
Epoch 17774/20000: Accuracy = 0.5882
Epoch 17775/20000: Accuracy = 0.4118
Epoch 17776/20000: Accuracy = 0.3824
Epoch 17777/20000: Accuracy = 0.3971
Epoch 17778/20000: Accuracy = 0.6103
Epoch 17779/20000: Accuracy = 0.3750
Epoch 17780/20000: Accuracy = 0.4044
Epoch 17781/20000: Accuracy = 0.6103
Epoch 17782/20000: Accuracy = 0.3750
Epoch 17783/20000: Accuracy = 0.3750
Epoch 17784/20000: Accuracy = 0.3971
Epoch 17785/20000: Accuracy = 0.5368
Epoch 17786/20000: Accuracy = 0.3750
Epoch 17787/20000: Accuracy = 0.3824
Epoch 17788/20000: Accuracy = 0.5662
Epoch 17789/20000: Accuracy = 0.4265
Epoch 17790/20000: Accuracy = 0.6176
Epoch 17791/20000: Accuracy = 0.6250
Epoch 17792/20000: Accuracy = 0.3750
Epoch 17793/20000: Accuracy = 0.5221
Epoch 17794/20000: Accuracy = 0.5515
Epoch 17795/20000: Accuracy = 0.6250
Epoch 17796/20000: Accuracy = 0.4265
Epoch 17797/20000: Accuracy = 0.5147
Epoch 17798/20000: Accuracy = 0.3971
Epoch 17799/20000: Accuracy = 0.4044
Epoch 17800/20000: Accuracy = 0.4118
Epoch 17801/20000: Accuracy = 0.5515
Epoch 17802/20000: Accuracy = 0.3897
Epoch 17803/20000: Accuracy = 0.6471
Epoch 17804/20000: Accuracy = 0.6250
Epoch 17805/20000: Accuracy = 0.4265
Epoch 17806/20000: Accuracy = 0.3824
Epoch 17807/20000: Accuracy = 0.5882
Epoch 17808/20000: Accuracy = 0.3750
Epoch 17809/20000: Accuracy = 0.6103
Epoch 17810/20000: Accuracy = 0.4118
Epoch 17811/20000: Accuracy = 0.5368
Epoch 17812/20000: Accuracy = 0.4118
Epoch 17813/20000: Accuracy = 0.6176
Epoch 17814/20000: Accuracy = 0.3088
Epoch 17815/20000: Accuracy = 0.5882
Epoch 17816/20000: Accuracy = 0.6912
```

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Epoch 17817/20000: Accuracy = 0.4044
Epoch 17818/20000: Accuracy = 0.5809
Epoch 17819/20000: Accuracy = 0.6029
Epoch 17820/20000: Accuracy = 0.6250
Epoch 17821/20000: Accuracy = 0.3750
Epoch 17822/20000: Accuracy = 0.4044
Epoch 17823/20000: Accuracy = 0.3750
Epoch 17824/20000: Accuracy = 0.3750
Epoch 17825/20000: Accuracy = 0.3824
Epoch 17826/20000: Accuracy = 0.6029
Epoch 17827/20000: Accuracy = 0.6103
Epoch 17828/20000: Accuracy = 0.6250
Epoch 17829/20000: Accuracy = 0.5074
Epoch 17830/20000: Accuracy = 0.6985
Epoch 17831/20000: Accuracy = 0.3750
Epoch 17832/20000: Accuracy = 0.5441
Epoch 17833/20000: Accuracy = 0.6250
Epoch 17834/20000: Accuracy = 0.5588
Epoch 17835/20000: Accuracy = 0.3162
Epoch 17836/20000: Accuracy = 0.3824
Epoch 17837/20000: Accuracy = 0.4044
Epoch 17838/20000: Accuracy = 0.6103
Epoch 17839/20000: Accuracy = 0.5000
Epoch 17840/20000: Accuracy = 0.5735
Epoch 17841/20000: Accuracy = 0.3750
Epoch 17842/20000: Accuracy = 0.3750
Epoch 17843/20000: Accuracy = 0.3456
Epoch 17844/20000: Accuracy = 0.5956
Epoch 17845/20000: Accuracy = 0.6103
Epoch 17846/20000: Accuracy = 0.3750
Epoch 17847/20000: Accuracy = 0.6324
Epoch 17848/20000: Accuracy = 0.4265
Epoch 17849/20000: Accuracy = 0.6103
Epoch 17850/20000: Accuracy = 0.6029
Epoch 17851/20000: Accuracy = 0.4926
Epoch 17852/20000: Accuracy = 0.3824
Epoch 17853/20000: Accuracy = 0.3750
Epoch 17854/20000: Accuracy = 0.4412
Epoch 17855/20000: Accuracy = 0.3750
Epoch 17856/20000: Accuracy = 0.5662
Epoch 17857/20000: Accuracy = 0.6250
Epoch 17858/20000: Accuracy = 0.3897
Epoch 17859/20000: Accuracy = 0.4412
Epoch 17860/20000: Accuracy = 0.6250
Epoch 17861/20000: Accuracy = 0.3750
Epoch 17862/20000: Accuracy = 0.6103
Epoch 17863/20000: Accuracy = 0.3456
Epoch 17864/20000: Accuracy = 0.6250
```

```
Epoch 17865/20000: Accuracy = 0.6103
Epoch 17866/20000: Accuracy = 0.3676
Epoch 17867/20000: Accuracy = 0.6250
Epoch 17868/20000: Accuracy = 0.3088
Epoch 17869/20000: Accuracy = 0.4926
Epoch 17870/20000: Accuracy = 0.3162
Epoch 17871/20000: Accuracy = 0.3750
Epoch 17872/20000: Accuracy = 0.3897
Epoch 17873/20000: Accuracy = 0.6103
Epoch 17874/20000: Accuracy = 0.4265
Epoch 17875/20000: Accuracy = 0.3676
Epoch 17876/20000: Accuracy = 0.3824
Epoch 17877/20000: Accuracy = 0.5882
Epoch 17878/20000: Accuracy = 0.3603
Epoch 17879/20000: Accuracy = 0.5662
Epoch 17880/20000: Accuracy = 0.6471
Epoch 17881/20000: Accuracy = 0.3456
Epoch 17882/20000: Accuracy = 0.6324
Epoch 17883/20000: Accuracy = 0.5221
Epoch 17884/20000: Accuracy = 0.6691
Epoch 17885/20000: Accuracy = 0.6029
Epoch 17886/20000: Accuracy = 0.4044
Epoch 17887/20000: Accuracy = 0.3750
Epoch 17888/20000: Accuracy = 0.5147
Epoch 17889/20000: Accuracy = 0.6176
Epoch 17890/20000: Accuracy = 0.3971
Epoch 17891/20000: Accuracy = 0.6103
Epoch 17892/20000: Accuracy = 0.4485
Epoch 17893/20000: Accuracy = 0.6103
Epoch 17894/20000: Accuracy = 0.6250
Epoch 17895/20000: Accuracy = 0.6397
Epoch 17896/20000: Accuracy = 0.6103
Epoch 17897/20000: Accuracy = 0.5221
Epoch 17898/20000: Accuracy = 0.6250
Epoch 17899/20000: Accuracy = 0.4632
Epoch 17900/20000: Accuracy = 0.6029
Epoch 17901/20000: Accuracy = 0.6250
Epoch 17902/20000: Accuracy = 0.3897
Epoch 17903/20000: Accuracy = 0.6691
Epoch 17904/20000: Accuracy = 0.6029
Epoch 17905/20000: Accuracy = 0.5588
Epoch 17906/20000: Accuracy = 0.5956
Epoch 17907/20000: Accuracy = 0.6250
Epoch 17908/20000: Accuracy = 0.4265
Epoch 17909/20000: Accuracy = 0.6176
Epoch 17910/20000: Accuracy = 0.6103
Epoch 17911/20000: Accuracy = 0.3750
Epoch 17912/20000: Accuracy = 0.6250
```

```
Epoch 17913/20000: Accuracy = 0.6397
Epoch 17914/20000: Accuracy = 0.6176
Epoch 17915/20000: Accuracy = 0.6250
Epoch 17916/20000: Accuracy = 0.5956
Epoch 17917/20000: Accuracy = 0.5441
Epoch 17918/20000: Accuracy = 0.6103
Epoch 17919/20000: Accuracy = 0.6618
Epoch 17920/20000: Accuracy = 0.6029
Epoch 17921/20000: Accuracy = 0.6471
Epoch 17922/20000: Accuracy = 0.4044
Epoch 17923/20000: Accuracy = 0.3897
Epoch 17924/20000: Accuracy = 0.3971
Epoch 17925/20000: Accuracy = 0.3750
Epoch 17926/20000: Accuracy = 0.3750
Epoch 17927/20000: Accuracy = 0.6471
Epoch 17928/20000: Accuracy = 0.5294
Epoch 17929/20000: Accuracy = 0.5662
Epoch 17930/20000: Accuracy = 0.6250
Epoch 17931/20000: Accuracy = 0.3750
Epoch 17932/20000: Accuracy = 0.5515
Epoch 17933/20000: Accuracy = 0.3750
Epoch 17934/20000: Accuracy = 0.4044
Epoch 17935/20000: Accuracy = 0.3529
Epoch 17936/20000: Accuracy = 0.4338
Epoch 17937/20000: Accuracy = 0.3971
Epoch 17938/20000: Accuracy = 0.6691
Epoch 17939/20000: Accuracy = 0.6324
Epoch 17940/20000: Accuracy = 0.4118
Epoch 17941/20000: Accuracy = 0.3529
Epoch 17942/20000: Accuracy = 0.6250
Epoch 17943/20000: Accuracy = 0.5368
Epoch 17944/20000: Accuracy = 0.5735
Epoch 17945/20000: Accuracy = 0.5221
Epoch 17946/20000: Accuracy = 0.6176
Epoch 17947/20000: Accuracy = 0.6324
Epoch 17948/20000: Accuracy = 0.6103
Epoch 17949/20000: Accuracy = 0.3824
Epoch 17950/20000: Accuracy = 0.3824
Epoch 17951/20000: Accuracy = 0.3750
Epoch 17952/20000: Accuracy = 0.3971
Epoch 17953/20000: Accuracy = 0.4044
Epoch 17954/20000: Accuracy = 0.6103
Epoch 17955/20000: Accuracy = 0.6250
Epoch 17956/20000: Accuracy = 0.4853
Epoch 17957/20000: Accuracy = 0.3824
Epoch 17958/20000: Accuracy = 0.4044
Epoch 17959/20000: Accuracy = 0.5882
Epoch 17960/20000: Accuracy = 0.5588
```

```
Epoch 17961/20000: Accuracy = 0.4853
Epoch 17962/20000: Accuracy = 0.6250
Epoch 17963/20000: Accuracy = 0.3750
Epoch 17964/20000: Accuracy = 0.6103
Epoch 17965/20000: Accuracy = 0.4191
Epoch 17966/20000: Accuracy = 0.4191
Epoch 17967/20000: Accuracy = 0.5956
Epoch 17968/20000: Accuracy = 0.6176
Epoch 17969/20000: Accuracy = 0.3897
Epoch 17970/20000: Accuracy = 0.5956
Epoch 17971/20000: Accuracy = 0.3676
Epoch 17972/20000: Accuracy = 0.5147
Epoch 17973/20000: Accuracy = 0.6250
Epoch 17974/20000: Accuracy = 0.4191
Epoch 17975/20000: Accuracy = 0.3603
Epoch 17976/20000: Accuracy = 0.3456
Epoch 17977/20000: Accuracy = 0.3824
Epoch 17978/20000: Accuracy = 0.3750
Epoch 17979/20000: Accuracy = 0.6250
Epoch 17980/20000: Accuracy = 0.6544
Epoch 17981/20000: Accuracy = 0.3750
Epoch 17982/20000: Accuracy = 0.6250
Epoch 17983/20000: Accuracy = 0.4853
Epoch 17984/20000: Accuracy = 0.3750
Epoch 17985/20000: Accuracy = 0.5956
Epoch 17986/20000: Accuracy = 0.3897
Epoch 17987/20000: Accuracy = 0.3897
Epoch 17988/20000: Accuracy = 0.3897
Epoch 17989/20000: Accuracy = 0.6544
Epoch 17990/20000: Accuracy = 0.6250
Epoch 17991/20000: Accuracy = 0.5515
Epoch 17992/20000: Accuracy = 0.5441
Epoch 17993/20000: Accuracy = 0.3750
Epoch 17994/20000: Accuracy = 0.6250
Epoch 17995/20000: Accuracy = 0.4706
Epoch 17996/20000: Accuracy = 0.3971
Epoch 17997/20000: Accuracy = 0.6250
Epoch 17998/20000: Accuracy = 0.3750
Epoch 17999/20000: Accuracy = 0.4044
Epoch 18000/20000: Accuracy = 0.3897
Epoch 18001/20000: Accuracy = 0.6250
Epoch 18002/20000: Accuracy = 0.6176
Epoch 18003/20000: Accuracy = 0.3824
Epoch 18004/20000: Accuracy = 0.7206
Epoch 18005/20000: Accuracy = 0.3750
Epoch 18006/20000: Accuracy = 0.6250
Epoch 18007/20000: Accuracy = 0.5882
Epoch 18008/20000: Accuracy = 0.3897
```

```
Epoch 18009/20000: Accuracy = 0.6029
Epoch 18010/20000: Accuracy = 0.5956
Epoch 18011/20000: Accuracy = 0.3676
Epoch 18012/20000: Accuracy = 0.4926
Epoch 18013/20000: Accuracy = 0.3971
Epoch 18014/20000: Accuracy = 0.6176
Epoch 18015/20000: Accuracy = 0.6250
Epoch 18016/20000: Accuracy = 0.3235
Epoch 18017/20000: Accuracy = 0.3750
Epoch 18018/20000: Accuracy = 0.6176
Epoch 18019/20000: Accuracy = 0.6250
Epoch 18020/20000: Accuracy = 0.4118
Epoch 18021/20000: Accuracy = 0.6103
Epoch 18022/20000: Accuracy = 0.6250
Epoch 18023/20000: Accuracy = 0.6250
Epoch 18024/20000: Accuracy = 0.5956
Epoch 18025/20000: Accuracy = 0.4191
Epoch 18026/20000: Accuracy = 0.3971
Epoch 18027/20000: Accuracy = 0.6471
Epoch 18028/20000: Accuracy = 0.6250
Epoch 18029/20000: Accuracy = 0.6103
Epoch 18030/20000: Accuracy = 0.3603
Epoch 18031/20000: Accuracy = 0.4338
Epoch 18032/20000: Accuracy = 0.3971
Epoch 18033/20000: Accuracy = 0.5882
Epoch 18034/20000: Accuracy = 0.5735
Epoch 18035/20000: Accuracy = 0.4191
Epoch 18036/20000: Accuracy = 0.3676
Epoch 18037/20000: Accuracy = 0.6618
Epoch 18038/20000: Accuracy = 0.6250
Epoch 18039/20000: Accuracy = 0.4118
Epoch 18040/20000: Accuracy = 0.6250
Epoch 18041/20000: Accuracy = 0.6029
Epoch 18042/20000: Accuracy = 0.3824
Epoch 18043/20000: Accuracy = 0.6176
Epoch 18044/20000: Accuracy = 0.5294
Epoch 18045/20000: Accuracy = 0.5735
Epoch 18046/20000: Accuracy = 0.3750
Epoch 18047/20000: Accuracy = 0.6250
Epoch 18048/20000: Accuracy = 0.4706
Epoch 18049/20000: Accuracy = 0.6250
Epoch 18050/20000: Accuracy = 0.4338
Epoch 18051/20000: Accuracy = 0.3824
Epoch 18052/20000: Accuracy = 0.6250
Epoch 18053/20000: Accuracy = 0.6250
Epoch 18054/20000: Accuracy = 0.3750
Epoch 18055/20000: Accuracy = 0.5441
Epoch 18056/20000: Accuracy = 0.3750
```

```
Epoch 18057/20000: Accuracy = 0.3824
Epoch 18058/20000: Accuracy = 0.6176
Epoch 18059/20000: Accuracy = 0.6103
Epoch 18060/20000: Accuracy = 0.3750
Epoch 18061/20000: Accuracy = 0.6250
Epoch 18062/20000: Accuracy = 0.3750
Epoch 18063/20000: Accuracy = 0.4412
Epoch 18064/20000: Accuracy = 0.3750
Epoch 18065/20000: Accuracy = 0.3750
Epoch 18066/20000: Accuracy = 0.6176
Epoch 18067/20000: Accuracy = 0.3676
Epoch 18068/20000: Accuracy = 0.6397
Epoch 18069/20000: Accuracy = 0.3824
Epoch 18070/20000: Accuracy = 0.6250
Epoch 18071/20000: Accuracy = 0.3676
Epoch 18072/20000: Accuracy = 0.5588
Epoch 18073/20000: Accuracy = 0.3897
Epoch 18074/20000: Accuracy = 0.3824
Epoch 18075/20000: Accuracy = 0.4191
Epoch 18076/20000: Accuracy = 0.3824
Epoch 18077/20000: Accuracy = 0.3824
Epoch 18078/20000: Accuracy = 0.6250
Epoch 18079/20000: Accuracy = 0.4044
Epoch 18080/20000: Accuracy = 0.6176
Epoch 18081/20000: Accuracy = 0.6397
Epoch 18082/20000: Accuracy = 0.4191
Epoch 18083/20000: Accuracy = 0.6029
Epoch 18084/20000: Accuracy = 0.3676
Epoch 18085/20000: Accuracy = 0.5956
Epoch 18086/20000: Accuracy = 0.5956
Epoch 18087/20000: Accuracy = 0.5956
Epoch 18088/20000: Accuracy = 0.3603
Epoch 18089/20000: Accuracy = 0.6176
Epoch 18090/20000: Accuracy = 0.4853
Epoch 18091/20000: Accuracy = 0.6176
Epoch 18092/20000: Accuracy = 0.4559
Epoch 18093/20000: Accuracy = 0.5809
Epoch 18094/20000: Accuracy = 0.5735
Epoch 18095/20000: Accuracy = 0.6176
Epoch 18096/20000: Accuracy = 0.6176
Epoch 18097/20000: Accuracy = 0.5956
Epoch 18098/20000: Accuracy = 0.3897
Epoch 18099/20000: Accuracy = 0.6397
Epoch 18100/20000: Accuracy = 0.5735
Epoch 18101/20000: Accuracy = 0.3529
Epoch 18102/20000: Accuracy = 0.6176
Epoch 18103/20000: Accuracy = 0.3897
Epoch 18104/20000: Accuracy = 0.3750
```

```
Epoch 18105/20000: Accuracy = 0.3750
Epoch 18106/20000: Accuracy = 0.6029
Epoch 18107/20000: Accuracy = 0.6029
Epoch 18108/20000: Accuracy = 0.4632
Epoch 18109/20000: Accuracy = 0.4706
Epoch 18110/20000: Accuracy = 0.5882
Epoch 18111/20000: Accuracy = 0.4779
Epoch 18112/20000: Accuracy = 0.6250
Epoch 18113/20000: Accuracy = 0.4559
Epoch 18114/20000: Accuracy = 0.6250
Epoch 18115/20000: Accuracy = 0.4853
Epoch 18116/20000: Accuracy = 0.3750
Epoch 18117/20000: Accuracy = 0.4044
Epoch 18118/20000: Accuracy = 0.6176
Epoch 18119/20000: Accuracy = 0.5515
Epoch 18120/20000: Accuracy = 0.6250
Epoch 18121/20000: Accuracy = 0.4412
Epoch 18122/20000: Accuracy = 0.6176
Epoch 18123/20000: Accuracy = 0.3750
Epoch 18124/20000: Accuracy = 0.6103
Epoch 18125/20000: Accuracy = 0.3235
Epoch 18126/20000: Accuracy = 0.6029
Epoch 18127/20000: Accuracy = 0.6912
Epoch 18128/20000: Accuracy = 0.4191
Epoch 18129/20000: Accuracy = 0.4485
Epoch 18130/20000: Accuracy = 0.6176
Epoch 18131/20000: Accuracy = 0.6618
Epoch 18132/20000: Accuracy = 0.3676
Epoch 18133/20000: Accuracy = 0.4338
Epoch 18134/20000: Accuracy = 0.3750
Epoch 18135/20000: Accuracy = 0.3750
Epoch 18136/20000: Accuracy = 0.6029
Epoch 18137/20000: Accuracy = 0.6250
Epoch 18138/20000: Accuracy = 0.6838
Epoch 18139/20000: Accuracy = 0.4118
Epoch 18140/20000: Accuracy = 0.5588
Epoch 18141/20000: Accuracy = 0.6912
Epoch 18142/20000: Accuracy = 0.6176
Epoch 18143/20000: Accuracy = 0.6544
Epoch 18144/20000: Accuracy = 0.4044
Epoch 18145/20000: Accuracy = 0.3971
Epoch 18146/20000: Accuracy = 0.5515
Epoch 18147/20000: Accuracy = 0.4191
Epoch 18148/20000: Accuracy = 0.3824
Epoch 18149/20000: Accuracy = 0.3529
Epoch 18150/20000: Accuracy = 0.3824
Epoch 18151/20000: Accuracy = 0.6029
Epoch 18152/20000: Accuracy = 0.4044
```

```
Epoch 18153/20000: Accuracy = 0.4265
Epoch 18154/20000: Accuracy = 0.5809
Epoch 18155/20000: Accuracy = 0.5956
Epoch 18156/20000: Accuracy = 0.5809
Epoch 18157/20000: Accuracy = 0.6103
Epoch 18158/20000: Accuracy = 0.6250
Epoch 18159/20000: Accuracy = 0.3750
Epoch 18160/20000: Accuracy = 0.3676
Epoch 18161/20000: Accuracy = 0.3897
Epoch 18162/20000: Accuracy = 0.4559
Epoch 18163/20000: Accuracy = 0.3824
Epoch 18164/20000: Accuracy = 0.6250
Epoch 18165/20000: Accuracy = 0.3676
Epoch 18166/20000: Accuracy = 0.4265
Epoch 18167/20000: Accuracy = 0.3971
Epoch 18168/20000: Accuracy = 0.3897
Epoch 18169/20000: Accuracy = 0.5515
Epoch 18170/20000: Accuracy = 0.6250
Epoch 18171/20000: Accuracy = 0.3971
Epoch 18172/20000: Accuracy = 0.3897
Epoch 18173/20000: Accuracy = 0.4412
Epoch 18174/20000: Accuracy = 0.4044
Epoch 18175/20000: Accuracy = 0.6324
Epoch 18176/20000: Accuracy = 0.5294
Epoch 18177/20000: Accuracy = 0.3750
Epoch 18178/20000: Accuracy = 0.3750
Epoch 18179/20000: Accuracy = 0.4265
Epoch 18180/20000: Accuracy = 0.6250
Epoch 18181/20000: Accuracy = 0.3456
Epoch 18182/20000: Accuracy = 0.3897
Epoch 18183/20000: Accuracy = 0.4044
Epoch 18184/20000: Accuracy = 0.3824
Epoch 18185/20000: Accuracy = 0.3015
Epoch 18186/20000: Accuracy = 0.4485
Epoch 18187/20000: Accuracy = 0.6250
Epoch 18188/20000: Accuracy = 0.5221
Epoch 18189/20000: Accuracy = 0.3750
Epoch 18190/20000: Accuracy = 0.6250
Epoch 18191/20000: Accuracy = 0.6250
Epoch 18192/20000: Accuracy = 0.4412
Epoch 18193/20000: Accuracy = 0.6250
Epoch 18194/20000: Accuracy = 0.5147
Epoch 18195/20000: Accuracy = 0.3824
Epoch 18196/20000: Accuracy = 0.6250
Epoch 18197/20000: Accuracy = 0.3897
Epoch 18198/20000: Accuracy = 0.6250
Epoch 18199/20000: Accuracy = 0.3824
Epoch 18200/20000: Accuracy = 0.3750
```

```
Epoch 18201/20000: Accuracy = 0.6103
Epoch 18202/20000: Accuracy = 0.3750
Epoch 18203/20000: Accuracy = 0.6176
Epoch 18204/20000: Accuracy = 0.5809
Epoch 18205/20000: Accuracy = 0.3529
Epoch 18206/20000: Accuracy = 0.3824
Epoch 18207/20000: Accuracy = 0.6250
Epoch 18208/20000: Accuracy = 0.3824
Epoch 18209/20000: Accuracy = 0.6250
Epoch 18210/20000: Accuracy = 0.6324
Epoch 18211/20000: Accuracy = 0.6250
Epoch 18212/20000: Accuracy = 0.4485
Epoch 18213/20000: Accuracy = 0.4265
Epoch 18214/20000: Accuracy = 0.6250
Epoch 18215/20000: Accuracy = 0.6103
Epoch 18216/20000: Accuracy = 0.3897
Epoch 18217/20000: Accuracy = 0.3382
Epoch 18218/20000: Accuracy = 0.6250
Epoch 18219/20000: Accuracy = 0.5588
Epoch 18220/20000: Accuracy = 0.4265
Epoch 18221/20000: Accuracy = 0.4632
Epoch 18222/20000: Accuracy = 0.3456
Epoch 18223/20000: Accuracy = 0.3971
Epoch 18224/20000: Accuracy = 0.4412
Epoch 18225/20000: Accuracy = 0.2647
Epoch 18226/20000: Accuracy = 0.3824
Epoch 18227/20000: Accuracy = 0.5956
Epoch 18228/20000: Accuracy = 0.3603
Epoch 18229/20000: Accuracy = 0.6250
Epoch 18230/20000: Accuracy = 0.3750
Epoch 18231/20000: Accuracy = 0.6176
Epoch 18232/20000: Accuracy = 0.6103
Epoch 18233/20000: Accuracy = 0.4853
Epoch 18234/20000: Accuracy = 0.3971
Epoch 18235/20000: Accuracy = 0.4044
Epoch 18236/20000: Accuracy = 0.6176
Epoch 18237/20000: Accuracy = 0.3824
Epoch 18238/20000: Accuracy = 0.4412
Epoch 18239/20000: Accuracy = 0.6029
Epoch 18240/20000: Accuracy = 0.3676
Epoch 18241/20000: Accuracy = 0.6250
Epoch 18242/20000: Accuracy = 0.3382
Epoch 18243/20000: Accuracy = 0.4191
Epoch 18244/20000: Accuracy = 0.5147
Epoch 18245/20000: Accuracy = 0.3676
Epoch 18246/20000: Accuracy = 0.3824
Epoch 18247/20000: Accuracy = 0.3750
Epoch 18248/20000: Accuracy = 0.4632
```

```
Epoch 18249/20000: Accuracy = 0.5294
Epoch 18250/20000: Accuracy = 0.6103
Epoch 18251/20000: Accuracy = 0.6250
Epoch 18252/20000: Accuracy = 0.3676
Epoch 18253/20000: Accuracy = 0.6250
Epoch 18254/20000: Accuracy = 0.6250
Epoch 18255/20000: Accuracy = 0.3750
Epoch 18256/20000: Accuracy = 0.4779
Epoch 18257/20000: Accuracy = 0.6103
Epoch 18258/20000: Accuracy = 0.3897
Epoch 18259/20000: Accuracy = 0.3750
Epoch 18260/20000: Accuracy = 0.6250
Epoch 18261/20000: Accuracy = 0.3750
Epoch 18262/20000: Accuracy = 0.3897
Epoch 18263/20000: Accuracy = 0.3235
Epoch 18264/20000: Accuracy = 0.6029
Epoch 18265/20000: Accuracy = 0.3971
Epoch 18266/20000: Accuracy = 0.3750
Epoch 18267/20000: Accuracy = 0.6250
Epoch 18268/20000: Accuracy = 0.5588
Epoch 18269/20000: Accuracy = 0.4044
Epoch 18270/20000: Accuracy = 0.4044
Epoch 18271/20000: Accuracy = 0.6103
Epoch 18272/20000: Accuracy = 0.4559
Epoch 18273/20000: Accuracy = 0.6250
Epoch 18274/20000: Accuracy = 0.6985
Epoch 18275/20000: Accuracy = 0.4265
Epoch 18276/20000: Accuracy = 0.5662
Epoch 18277/20000: Accuracy = 0.5956
Epoch 18278/20000: Accuracy = 0.6029
Epoch 18279/20000: Accuracy = 0.6397
Epoch 18280/20000: Accuracy = 0.5221
Epoch 18281/20000: Accuracy = 0.5809
Epoch 18282/20000: Accuracy = 0.3824
Epoch 18283/20000: Accuracy = 0.3750
Epoch 18284/20000: Accuracy = 0.6250
Epoch 18285/20000: Accuracy = 0.5294
Epoch 18286/20000: Accuracy = 0.3750
Epoch 18287/20000: Accuracy = 0.6838
Epoch 18288/20000: Accuracy = 0.5735
Epoch 18289/20000: Accuracy = 0.3824
Epoch 18290/20000: Accuracy = 0.3750
Epoch 18291/20000: Accuracy = 0.6176
Epoch 18292/20000: Accuracy = 0.4779
Epoch 18293/20000: Accuracy = 0.6103
Epoch 18294/20000: Accuracy = 0.6250
Epoch 18295/20000: Accuracy = 0.6250
Epoch 18296/20000: Accuracy = 0.6176
```

```
Epoch 18297/20000: Accuracy = 0.6250
Epoch 18298/20000: Accuracy = 0.3529
Epoch 18299/20000: Accuracy = 0.6176
Epoch 18300/20000: Accuracy = 0.3750
Epoch 18301/20000: Accuracy = 0.4412
Epoch 18302/20000: Accuracy = 0.6397
Epoch 18303/20000: Accuracy = 0.4412
Epoch 18304/20000: Accuracy = 0.3750
Epoch 18305/20000: Accuracy = 0.6250
Epoch 18306/20000: Accuracy = 0.3897
Epoch 18307/20000: Accuracy = 0.3824
Epoch 18308/20000: Accuracy = 0.5074
Epoch 18309/20000: Accuracy = 0.6029
Epoch 18310/20000: Accuracy = 0.3750
Epoch 18311/20000: Accuracy = 0.6176
Epoch 18312/20000: Accuracy = 0.5147
Epoch 18313/20000: Accuracy = 0.3824
Epoch 18314/20000: Accuracy = 0.6250
Epoch 18315/20000: Accuracy = 0.5882
Epoch 18316/20000: Accuracy = 0.6250
Epoch 18317/20000: Accuracy = 0.6176
Epoch 18318/20000: Accuracy = 0.4926
Epoch 18319/20000: Accuracy = 0.5441
Epoch 18320/20000: Accuracy = 0.6176
Epoch 18321/20000: Accuracy = 0.5441
Epoch 18322/20000: Accuracy = 0.6250
Epoch 18323/20000: Accuracy = 0.3897
Epoch 18324/20000: Accuracy = 0.4118
Epoch 18325/20000: Accuracy = 0.3750
Epoch 18326/20000: Accuracy = 0.6176
Epoch 18327/20000: Accuracy = 0.3824
Epoch 18328/20000: Accuracy = 0.5956
Epoch 18329/20000: Accuracy = 0.6250
Epoch 18330/20000: Accuracy = 0.6176
Epoch 18331/20000: Accuracy = 0.3824
Epoch 18332/20000: Accuracy = 0.3897
Epoch 18333/20000: Accuracy = 0.6176
Epoch 18334/20000: Accuracy = 0.3824
Epoch 18335/20000: Accuracy = 0.6544
Epoch 18336/20000: Accuracy = 0.4559
Epoch 18337/20000: Accuracy = 0.6250
Epoch 18338/20000: Accuracy = 0.5588
Epoch 18339/20000: Accuracy = 0.3824
Epoch 18340/20000: Accuracy = 0.3750
Epoch 18341/20000: Accuracy = 0.3603
Epoch 18342/20000: Accuracy = 0.3971
Epoch 18343/20000: Accuracy = 0.3897
Epoch 18344/20000: Accuracy = 0.3824
```

```
Epoch 18345/20000: Accuracy = 0.3824
Epoch 18346/20000: Accuracy = 0.6103
Epoch 18347/20000: Accuracy = 0.3824
Epoch 18348/20000: Accuracy = 0.4338
Epoch 18349/20000: Accuracy = 0.3529
Epoch 18350/20000: Accuracy = 0.4265
Epoch 18351/20000: Accuracy = 0.6250
Epoch 18352/20000: Accuracy = 0.6397
Epoch 18353/20000: Accuracy = 0.5294
Epoch 18354/20000: Accuracy = 0.3750
Epoch 18355/20000: Accuracy = 0.5147
Epoch 18356/20000: Accuracy = 0.4118
Epoch 18357/20000: Accuracy = 0.4412
Epoch 18358/20000: Accuracy = 0.6250
Epoch 18359/20000: Accuracy = 0.6029
Epoch 18360/20000: Accuracy = 0.4265
Epoch 18361/20000: Accuracy = 0.6250
Epoch 18362/20000: Accuracy = 0.6250
Epoch 18363/20000: Accuracy = 0.3750
Epoch 18364/20000: Accuracy = 0.4044
Epoch 18365/20000: Accuracy = 0.6250
Epoch 18366/20000: Accuracy = 0.3676
Epoch 18367/20000: Accuracy = 0.3750
Epoch 18368/20000: Accuracy = 0.5956
Epoch 18369/20000: Accuracy = 0.7132
Epoch 18370/20000: Accuracy = 0.5956
Epoch 18371/20000: Accuracy = 0.6397
Epoch 18372/20000: Accuracy = 0.5882
Epoch 18373/20000: Accuracy = 0.6176
Epoch 18374/20000: Accuracy = 0.3750
Epoch 18375/20000: Accuracy = 0.5588
Epoch 18376/20000: Accuracy = 0.6250
Epoch 18377/20000: Accuracy = 0.6324
Epoch 18378/20000: Accuracy = 0.3235
Epoch 18379/20000: Accuracy = 0.3603
Epoch 18380/20000: Accuracy = 0.3750
Epoch 18381/20000: Accuracy = 0.3897
Epoch 18382/20000: Accuracy = 0.4191
Epoch 18383/20000: Accuracy = 0.3456
Epoch 18384/20000: Accuracy = 0.3824
Epoch 18385/20000: Accuracy = 0.3750
Epoch 18386/20000: Accuracy = 0.6103
Epoch 18387/20000: Accuracy = 0.5441
Epoch 18388/20000: Accuracy = 0.5515
Epoch 18389/20000: Accuracy = 0.5662
Epoch 18390/20000: Accuracy = 0.5294
Epoch 18391/20000: Accuracy = 0.6250
Epoch 18392/20000: Accuracy = 0.3750
```

```
Epoch 18393/20000: Accuracy = 0.3824
Epoch 18394/20000: Accuracy = 0.6103
Epoch 18395/20000: Accuracy = 0.3971
Epoch 18396/20000: Accuracy = 0.3971
Epoch 18397/20000: Accuracy = 0.6397
Epoch 18398/20000: Accuracy = 0.5882
Epoch 18399/20000: Accuracy = 0.6176
Epoch 18400/20000: Accuracy = 0.6176
Epoch 18401/20000: Accuracy = 0.6324
Epoch 18402/20000: Accuracy = 0.5368
Epoch 18403/20000: Accuracy = 0.4265
Epoch 18404/20000: Accuracy = 0.3971
Epoch 18405/20000: Accuracy = 0.6250
Epoch 18406/20000: Accuracy = 0.4926
Epoch 18407/20000: Accuracy = 0.3824
Epoch 18408/20000: Accuracy = 0.5956
Epoch 18409/20000: Accuracy = 0.4853
Epoch 18410/20000: Accuracy = 0.6471
Epoch 18411/20000: Accuracy = 0.6103
Epoch 18412/20000: Accuracy = 0.4926
Epoch 18413/20000: Accuracy = 0.3971
Epoch 18414/20000: Accuracy = 0.3824
Epoch 18415/20000: Accuracy = 0.6176
Epoch 18416/20000: Accuracy = 0.3750
Epoch 18417/20000: Accuracy = 0.3750
Epoch 18418/20000: Accuracy = 0.3750
Epoch 18419/20000: Accuracy = 0.6324
Epoch 18420/20000: Accuracy = 0.6103
Epoch 18421/20000: Accuracy = 0.6250
Epoch 18422/20000: Accuracy = 0.4926
Epoch 18423/20000: Accuracy = 0.3750
Epoch 18424/20000: Accuracy = 0.6176
Epoch 18425/20000: Accuracy = 0.3824
Epoch 18426/20000: Accuracy = 0.3897
Epoch 18427/20000: Accuracy = 0.6103
Epoch 18428/20000: Accuracy = 0.4191
Epoch 18429/20000: Accuracy = 0.5000
Epoch 18430/20000: Accuracy = 0.6250
Epoch 18431/20000: Accuracy = 0.4191
Epoch 18432/20000: Accuracy = 0.4044
Epoch 18433/20000: Accuracy = 0.5882
Epoch 18434/20000: Accuracy = 0.3824
Epoch 18435/20000: Accuracy = 0.3750
Epoch 18436/20000: Accuracy = 0.6176
Epoch 18437/20000: Accuracy = 0.3897
Epoch 18438/20000: Accuracy = 0.6471
Epoch 18439/20000: Accuracy = 0.6250
Epoch 18440/20000: Accuracy = 0.6176
```

```
Epoch 18441/20000: Accuracy = 0.3897
Epoch 18442/20000: Accuracy = 0.6324
Epoch 18443/20000: Accuracy = 0.3824
Epoch 18444/20000: Accuracy = 0.3750
Epoch 18445/20000: Accuracy = 0.6250
Epoch 18446/20000: Accuracy = 0.6324
Epoch 18447/20000: Accuracy = 0.7059
Epoch 18448/20000: Accuracy = 0.6250
Epoch 18449/20000: Accuracy = 0.6324
Epoch 18450/20000: Accuracy = 0.6029
Epoch 18451/20000: Accuracy = 0.3382
Epoch 18452/20000: Accuracy = 0.6176
Epoch 18453/20000: Accuracy = 0.3824
Epoch 18454/20000: Accuracy = 0.6471
Epoch 18455/20000: Accuracy = 0.4265
Epoch 18456/20000: Accuracy = 0.6324
Epoch 18457/20000: Accuracy = 0.3897
Epoch 18458/20000: Accuracy = 0.6250
Epoch 18459/20000: Accuracy = 0.6618
Epoch 18460/20000: Accuracy = 0.3897
Epoch 18461/20000: Accuracy = 0.6103
Epoch 18462/20000: Accuracy = 0.6250
Epoch 18463/20000: Accuracy = 0.4044
Epoch 18464/20000: Accuracy = 0.3824
Epoch 18465/20000: Accuracy = 0.4485
Epoch 18466/20000: Accuracy = 0.5956
Epoch 18467/20000: Accuracy = 0.5735
Epoch 18468/20000: Accuracy = 0.7132
Epoch 18469/20000: Accuracy = 0.6176
Epoch 18470/20000: Accuracy = 0.6103
Epoch 18471/20000: Accuracy = 0.4412
Epoch 18472/20000: Accuracy = 0.3750
Epoch 18473/20000: Accuracy = 0.6544
Epoch 18474/20000: Accuracy = 0.3824
Epoch 18475/20000: Accuracy = 0.6250
Epoch 18476/20000: Accuracy = 0.6250
Epoch 18477/20000: Accuracy = 0.4118
Epoch 18478/20000: Accuracy = 0.5882
Epoch 18479/20000: Accuracy = 0.6176
Epoch 18480/20000: Accuracy = 0.6176
Epoch 18481/20000: Accuracy = 0.4412
Epoch 18482/20000: Accuracy = 0.6250
Epoch 18483/20000: Accuracy = 0.5147
Epoch 18484/20000: Accuracy = 0.6176
Epoch 18485/20000: Accuracy = 0.5956
Epoch 18486/20000: Accuracy = 0.5882
Epoch 18487/20000: Accuracy = 0.3750
Epoch 18488/20000: Accuracy = 0.3750
```

```
Epoch 18489/20000: Accuracy = 0.6765
Epoch 18490/20000: Accuracy = 0.3824
Epoch 18491/20000: Accuracy = 0.3750
Epoch 18492/20000: Accuracy = 0.3750
Epoch 18493/20000: Accuracy = 0.4191
Epoch 18494/20000: Accuracy = 0.4191
Epoch 18495/20000: Accuracy = 0.3824
Epoch 18496/20000: Accuracy = 0.4044
Epoch 18497/20000: Accuracy = 0.4265
Epoch 18498/20000: Accuracy = 0.4485
Epoch 18499/20000: Accuracy = 0.6838
Epoch 18500/20000: Accuracy = 0.2941
Epoch 18501/20000: Accuracy = 0.3971
Epoch 18502/20000: Accuracy = 0.6029
Epoch 18503/20000: Accuracy = 0.6471
Epoch 18504/20000: Accuracy = 0.5662
Epoch 18505/20000: Accuracy = 0.6103
Epoch 18506/20000: Accuracy = 0.6103
Epoch 18507/20000: Accuracy = 0.6250
Epoch 18508/20000: Accuracy = 0.3897
Epoch 18509/20000: Accuracy = 0.4338
Epoch 18510/20000: Accuracy = 0.3824
Epoch 18511/20000: Accuracy = 0.6838
Epoch 18512/20000: Accuracy = 0.3824
Epoch 18513/20000: Accuracy = 0.3676
Epoch 18514/20000: Accuracy = 0.4118
Epoch 18515/20000: Accuracy = 0.3750
Epoch 18516/20000: Accuracy = 0.5882
Epoch 18517/20000: Accuracy = 0.3824
Epoch 18518/20000: Accuracy = 0.3603
Epoch 18519/20000: Accuracy = 0.3824
Epoch 18520/20000: Accuracy = 0.4118
Epoch 18521/20000: Accuracy = 0.6250
Epoch 18522/20000: Accuracy = 0.6250
Epoch 18523/20000: Accuracy = 0.4706
Epoch 18524/20000: Accuracy = 0.5441
Epoch 18525/20000: Accuracy = 0.3824
Epoch 18526/20000: Accuracy = 0.7132
Epoch 18527/20000: Accuracy = 0.3824
Epoch 18528/20000: Accuracy = 0.6176
Epoch 18529/20000: Accuracy = 0.6250
Epoch 18530/20000: Accuracy = 0.3603
Epoch 18531/20000: Accuracy = 0.3676
Epoch 18532/20000: Accuracy = 0.5735
Epoch 18533/20000: Accuracy = 0.3971
Epoch 18534/20000: Accuracy = 0.4412
Epoch 18535/20000: Accuracy = 0.3824
Epoch 18536/20000: Accuracy = 0.4191
```

```
Epoch 18537/20000: Accuracy = 0.6250
Epoch 18538/20000: Accuracy = 0.6250
Epoch 18539/20000: Accuracy = 0.6176
Epoch 18540/20000: Accuracy = 0.3750
Epoch 18541/20000: Accuracy = 0.5735
Epoch 18542/20000: Accuracy = 0.3750
Epoch 18543/20000: Accuracy = 0.4632
Epoch 18544/20000: Accuracy = 0.3750
Epoch 18545/20000: Accuracy = 0.3897
Epoch 18546/20000: Accuracy = 0.3897
Epoch 18547/20000: Accuracy = 0.3676
Epoch 18548/20000: Accuracy = 0.3897
Epoch 18549/20000: Accuracy = 0.5809
Epoch 18550/20000: Accuracy = 0.6250
Epoch 18551/20000: Accuracy = 0.4044
Epoch 18552/20000: Accuracy = 0.6324
Epoch 18553/20000: Accuracy = 0.6838
Epoch 18554/20000: Accuracy = 0.3750
Epoch 18555/20000: Accuracy = 0.5956
Epoch 18556/20000: Accuracy = 0.3897
Epoch 18557/20000: Accuracy = 0.5368
Epoch 18558/20000: Accuracy = 0.3162
Epoch 18559/20000: Accuracy = 0.3088
Epoch 18560/20000: Accuracy = 0.6838
Epoch 18561/20000: Accuracy = 0.5662
Epoch 18562/20000: Accuracy = 0.6176
Epoch 18563/20000: Accuracy = 0.6397
Epoch 18564/20000: Accuracy = 0.6029
Epoch 18565/20000: Accuracy = 0.6691
Epoch 18566/20000: Accuracy = 0.3750
Epoch 18567/20000: Accuracy = 0.3824
Epoch 18568/20000: Accuracy = 0.5809
Epoch 18569/20000: Accuracy = 0.3824
Epoch 18570/20000: Accuracy = 0.5441
Epoch 18571/20000: Accuracy = 0.5809
Epoch 18572/20000: Accuracy = 0.4485
Epoch 18573/20000: Accuracy = 0.3750
Epoch 18574/20000: Accuracy = 0.6250
Epoch 18575/20000: Accuracy = 0.6324
Epoch 18576/20000: Accuracy = 0.6324
Epoch 18577/20000: Accuracy = 0.4118
Epoch 18578/20000: Accuracy = 0.3824
Epoch 18579/20000: Accuracy = 0.3824
Epoch 18580/20000: Accuracy = 0.5882
Epoch 18581/20000: Accuracy = 0.5809
Epoch 18582/20000: Accuracy = 0.5588
Epoch 18583/20000: Accuracy = 0.5662
Epoch 18584/20000: Accuracy = 0.6029
```

```
Epoch 18585/20000: Accuracy = 0.3750
Epoch 18586/20000: Accuracy = 0.5588
Epoch 18587/20000: Accuracy = 0.6544
Epoch 18588/20000: Accuracy = 0.6324
Epoch 18589/20000: Accuracy = 0.3676
Epoch 18590/20000: Accuracy = 0.3897
Epoch 18591/20000: Accuracy = 0.3750
Epoch 18592/20000: Accuracy = 0.3603
Epoch 18593/20000: Accuracy = 0.3750
Epoch 18594/20000: Accuracy = 0.3309
Epoch 18595/20000: Accuracy = 0.7500
Epoch 18596/20000: Accuracy = 0.5735
Epoch 18597/20000: Accuracy = 0.6250
Epoch 18598/20000: Accuracy = 0.5441
Epoch 18599/20000: Accuracy = 0.6176
Epoch 18600/20000: Accuracy = 0.3750
Epoch 18601/20000: Accuracy = 0.3824
Epoch 18602/20000: Accuracy = 0.5515
Epoch 18603/20000: Accuracy = 0.5956
Epoch 18604/20000: Accuracy = 0.6544
Epoch 18605/20000: Accuracy = 0.3456
Epoch 18606/20000: Accuracy = 0.6397
Epoch 18607/20000: Accuracy = 0.6250
Epoch 18608/20000: Accuracy = 0.3824
Epoch 18609/20000: Accuracy = 0.6397
Epoch 18610/20000: Accuracy = 0.6544
Epoch 18611/20000: Accuracy = 0.4926
Epoch 18612/20000: Accuracy = 0.6103
Epoch 18613/20000: Accuracy = 0.3824
Epoch 18614/20000: Accuracy = 0.5956
Epoch 18615/20000: Accuracy = 0.6250
Epoch 18616/20000: Accuracy = 0.6250
Epoch 18617/20000: Accuracy = 0.6691
Epoch 18618/20000: Accuracy = 0.4044
Epoch 18619/20000: Accuracy = 0.4118
Epoch 18620/20000: Accuracy = 0.6176
Epoch 18621/20000: Accuracy = 0.4632
Epoch 18622/20000: Accuracy = 0.3971
Epoch 18623/20000: Accuracy = 0.6029
Epoch 18624/20000: Accuracy = 0.3750
Epoch 18625/20000: Accuracy = 0.3750
Epoch 18626/20000: Accuracy = 0.3603
Epoch 18627/20000: Accuracy = 0.5956
Epoch 18628/20000: Accuracy = 0.4118
Epoch 18629/20000: Accuracy = 0.6397
Epoch 18630/20000: Accuracy = 0.3750
Epoch 18631/20000: Accuracy = 0.3824
Epoch 18632/20000: Accuracy = 0.5515
```

```
Epoch 18633/20000: Accuracy = 0.5809
Epoch 18634/20000: Accuracy = 0.4338
Epoch 18635/20000: Accuracy = 0.6250
Epoch 18636/20000: Accuracy = 0.6397
Epoch 18637/20000: Accuracy = 0.6250
Epoch 18638/20000: Accuracy = 0.5441
Epoch 18639/20000: Accuracy = 0.6029
Epoch 18640/20000: Accuracy = 0.3897
Epoch 18641/20000: Accuracy = 0.5588
Epoch 18642/20000: Accuracy = 0.4044
Epoch 18643/20000: Accuracy = 0.3750
Epoch 18644/20000: Accuracy = 0.4118
Epoch 18645/20000: Accuracy = 0.3750
Epoch 18646/20000: Accuracy = 0.4044
Epoch 18647/20000: Accuracy = 0.6176
Epoch 18648/20000: Accuracy = 0.4853
Epoch 18649/20000: Accuracy = 0.4118
Epoch 18650/20000: Accuracy = 0.6250
Epoch 18651/20000: Accuracy = 0.3529
Epoch 18652/20000: Accuracy = 0.4779
Epoch 18653/20000: Accuracy = 0.6250
Epoch 18654/20000: Accuracy = 0.5515
Epoch 18655/20000: Accuracy = 0.4853
Epoch 18656/20000: Accuracy = 0.6250
Epoch 18657/20000: Accuracy = 0.6103
Epoch 18658/20000: Accuracy = 0.6250
Epoch 18659/20000: Accuracy = 0.3750
Epoch 18660/20000: Accuracy = 0.6397
Epoch 18661/20000: Accuracy = 0.6176
Epoch 18662/20000: Accuracy = 0.3897
Epoch 18663/20000: Accuracy = 0.4118
Epoch 18664/20000: Accuracy = 0.6103
Epoch 18665/20000: Accuracy = 0.3750
Epoch 18666/20000: Accuracy = 0.6250
Epoch 18667/20000: Accuracy = 0.5809
Epoch 18668/20000: Accuracy = 0.6103
Epoch 18669/20000: Accuracy = 0.3750
Epoch 18670/20000: Accuracy = 0.6324
Epoch 18671/20000: Accuracy = 0.3897
Epoch 18672/20000: Accuracy = 0.3971
Epoch 18673/20000: Accuracy = 0.5368
Epoch 18674/20000: Accuracy = 0.3971
Epoch 18675/20000: Accuracy = 0.3971
Epoch 18676/20000: Accuracy = 0.3676
Epoch 18677/20000: Accuracy = 0.4191
Epoch 18678/20000: Accuracy = 0.3824
Epoch 18679/20000: Accuracy = 0.6176
Epoch 18680/20000: Accuracy = 0.3750
```

```
Epoch 18681/20000: Accuracy = 0.4338
Epoch 18682/20000: Accuracy = 0.3603
Epoch 18683/20000: Accuracy = 0.6250
Epoch 18684/20000: Accuracy = 0.3897
Epoch 18685/20000: Accuracy = 0.6250
Epoch 18686/20000: Accuracy = 0.3750
Epoch 18687/20000: Accuracy = 0.6103
Epoch 18688/20000: Accuracy = 0.6029
Epoch 18689/20000: Accuracy = 0.6250
Epoch 18690/20000: Accuracy = 0.6765
Epoch 18691/20000: Accuracy = 0.4632
Epoch 18692/20000: Accuracy = 0.5809
Epoch 18693/20000: Accuracy = 0.5147
Epoch 18694/20000: Accuracy = 0.6250
Epoch 18695/20000: Accuracy = 0.6103
Epoch 18696/20000: Accuracy = 0.6250
Epoch 18697/20000: Accuracy = 0.4265
Epoch 18698/20000: Accuracy = 0.3824
Epoch 18699/20000: Accuracy = 0.4632
Epoch 18700/20000: Accuracy = 0.6250
Epoch 18701/20000: Accuracy = 0.5882
Epoch 18702/20000: Accuracy = 0.6103
Epoch 18703/20000: Accuracy = 0.3603
Epoch 18704/20000: Accuracy = 0.3750
Epoch 18705/20000: Accuracy = 0.6324
Epoch 18706/20000: Accuracy = 0.6176
Epoch 18707/20000: Accuracy = 0.5882
Epoch 18708/20000: Accuracy = 0.4044
Epoch 18709/20000: Accuracy = 0.3750
Epoch 18710/20000: Accuracy = 0.3750
Epoch 18711/20000: Accuracy = 0.5956
Epoch 18712/20000: Accuracy = 0.4044
Epoch 18713/20000: Accuracy = 0.4191
Epoch 18714/20000: Accuracy = 0.3382
Epoch 18715/20000: Accuracy = 0.4044
Epoch 18716/20000: Accuracy = 0.4118
Epoch 18717/20000: Accuracy = 0.3971
Epoch 18718/20000: Accuracy = 0.6176
Epoch 18719/20000: Accuracy = 0.5294
Epoch 18720/20000: Accuracy = 0.7279
Epoch 18721/20000: Accuracy = 0.6103
Epoch 18722/20000: Accuracy = 0.5882
Epoch 18723/20000: Accuracy = 0.6029
Epoch 18724/20000: Accuracy = 0.3824
Epoch 18725/20000: Accuracy = 0.5882
Epoch 18726/20000: Accuracy = 0.3824
Epoch 18727/20000: Accuracy = 0.3750
Epoch 18728/20000: Accuracy = 0.4706
```

```
Epoch 18729/20000: Accuracy = 0.3676
Epoch 18730/20000: Accuracy = 0.6324
Epoch 18731/20000: Accuracy = 0.6250
Epoch 18732/20000: Accuracy = 0.5588
Epoch 18733/20000: Accuracy = 0.6250
Epoch 18734/20000: Accuracy = 0.5956
Epoch 18735/20000: Accuracy = 0.5882
Epoch 18736/20000: Accuracy = 0.6176
Epoch 18737/20000: Accuracy = 0.3456
Epoch 18738/20000: Accuracy = 0.3750
Epoch 18739/20000: Accuracy = 0.5809
Epoch 18740/20000: Accuracy = 0.3603
Epoch 18741/20000: Accuracy = 0.5441
Epoch 18742/20000: Accuracy = 0.6176
Epoch 18743/20000: Accuracy = 0.3824
Epoch 18744/20000: Accuracy = 0.3824
Epoch 18745/20000: Accuracy = 0.3456
Epoch 18746/20000: Accuracy = 0.3824
Epoch 18747/20000: Accuracy = 0.4485
Epoch 18748/20000: Accuracy = 0.6103
Epoch 18749/20000: Accuracy = 0.4191
Epoch 18750/20000: Accuracy = 0.7206
Epoch 18751/20000: Accuracy = 0.5662
Epoch 18752/20000: Accuracy = 0.5809
Epoch 18753/20000: Accuracy = 0.6250
Epoch 18754/20000: Accuracy = 0.3750
Epoch 18755/20000: Accuracy = 0.5662
Epoch 18756/20000: Accuracy = 0.6176
Epoch 18757/20000: Accuracy = 0.3824
Epoch 18758/20000: Accuracy = 0.6250
Epoch 18759/20000: Accuracy = 0.5956
Epoch 18760/20000: Accuracy = 0.3897
Epoch 18761/20000: Accuracy = 0.6324
Epoch 18762/20000: Accuracy = 0.4044
Epoch 18763/20000: Accuracy = 0.3603
Epoch 18764/20000: Accuracy = 0.4926
Epoch 18765/20000: Accuracy = 0.5368
Epoch 18766/20000: Accuracy = 0.3750
Epoch 18767/20000: Accuracy = 0.6250
Epoch 18768/20000: Accuracy = 0.5368
Epoch 18769/20000: Accuracy = 0.2868
Epoch 18770/20000: Accuracy = 0.6029
Epoch 18771/20000: Accuracy = 0.3824
Epoch 18772/20000: Accuracy = 0.3088
Epoch 18773/20000: Accuracy = 0.6471
Epoch 18774/20000: Accuracy = 0.3750
Epoch 18775/20000: Accuracy = 0.3824
Epoch 18776/20000: Accuracy = 0.6176
```

```
Epoch 18777/20000: Accuracy = 0.6544
Epoch 18778/20000: Accuracy = 0.6176
Epoch 18779/20000: Accuracy = 0.3897
Epoch 18780/20000: Accuracy = 0.4265
Epoch 18781/20000: Accuracy = 0.3750
Epoch 18782/20000: Accuracy = 0.6250
Epoch 18783/20000: Accuracy = 0.3971
Epoch 18784/20000: Accuracy = 0.5809
Epoch 18785/20000: Accuracy = 0.6176
Epoch 18786/20000: Accuracy = 0.6250
Epoch 18787/20000: Accuracy = 0.3750
Epoch 18788/20000: Accuracy = 0.3235
Epoch 18789/20000: Accuracy = 0.4412
Epoch 18790/20000: Accuracy = 0.3750
Epoch 18791/20000: Accuracy = 0.6324
Epoch 18792/20000: Accuracy = 0.6250
Epoch 18793/20000: Accuracy = 0.6691
Epoch 18794/20000: Accuracy = 0.3676
Epoch 18795/20000: Accuracy = 0.6029
Epoch 18796/20000: Accuracy = 0.5441
Epoch 18797/20000: Accuracy = 0.3750
Epoch 18798/20000: Accuracy = 0.3750
Epoch 18799/20000: Accuracy = 0.4559
Epoch 18800/20000: Accuracy = 0.5368
Epoch 18801/20000: Accuracy = 0.5368
Epoch 18802/20000: Accuracy = 0.4191
Epoch 18803/20000: Accuracy = 0.6176
Epoch 18804/20000: Accuracy = 0.3750
Epoch 18805/20000: Accuracy = 0.4118
Epoch 18806/20000: Accuracy = 0.6250
Epoch 18807/20000: Accuracy = 0.3971
Epoch 18808/20000: Accuracy = 0.3750
Epoch 18809/20000: Accuracy = 0.7059
Epoch 18810/20000: Accuracy = 0.3750
Epoch 18811/20000: Accuracy = 0.6176
Epoch 18812/20000: Accuracy = 0.6103
Epoch 18813/20000: Accuracy = 0.6103
Epoch 18814/20000: Accuracy = 0.3676
Epoch 18815/20000: Accuracy = 0.6250
Epoch 18816/20000: Accuracy = 0.3750
Epoch 18817/20000: Accuracy = 0.5735
Epoch 18818/20000: Accuracy = 0.5735
Epoch 18819/20000: Accuracy = 0.7426
Epoch 18820/20000: Accuracy = 0.5000
Epoch 18821/20000: Accuracy = 0.6250
Epoch 18822/20000: Accuracy = 0.3897
Epoch 18823/20000: Accuracy = 0.3603
Epoch 18824/20000: Accuracy = 0.3824
```

```
Epoch 18825/20000: Accuracy = 0.3750
Epoch 18826/20000: Accuracy = 0.5809
Epoch 18827/20000: Accuracy = 0.6250
Epoch 18828/20000: Accuracy = 0.6985
Epoch 18829/20000: Accuracy = 0.5956
Epoch 18830/20000: Accuracy = 0.5147
Epoch 18831/20000: Accuracy = 0.4265
Epoch 18832/20000: Accuracy = 0.4485
Epoch 18833/20000: Accuracy = 0.5809
Epoch 18834/20000: Accuracy = 0.5956
Epoch 18835/20000: Accuracy = 0.3750
Epoch 18836/20000: Accuracy = 0.6250
Epoch 18837/20000: Accuracy = 0.6029
Epoch 18838/20000: Accuracy = 0.5956
Epoch 18839/20000: Accuracy = 0.6250
Epoch 18840/20000: Accuracy = 0.6691
Epoch 18841/20000: Accuracy = 0.6176
Epoch 18842/20000: Accuracy = 0.3750
Epoch 18843/20000: Accuracy = 0.6176
Epoch 18844/20000: Accuracy = 0.3529
Epoch 18845/20000: Accuracy = 0.5441
Epoch 18846/20000: Accuracy = 0.3750
Epoch 18847/20000: Accuracy = 0.6103
Epoch 18848/20000: Accuracy = 0.3824
Epoch 18849/20000: Accuracy = 0.4265
Epoch 18850/20000: Accuracy = 0.5441
Epoch 18851/20000: Accuracy = 0.5368
Epoch 18852/20000: Accuracy = 0.3824
Epoch 18853/20000: Accuracy = 0.6250
Epoch 18854/20000: Accuracy = 0.6985
Epoch 18855/20000: Accuracy = 0.3824
Epoch 18856/20000: Accuracy = 0.5000
Epoch 18857/20000: Accuracy = 0.5147
Epoch 18858/20000: Accuracy = 0.4779
Epoch 18859/20000: Accuracy = 0.5956
Epoch 18860/20000: Accuracy = 0.5735
Epoch 18861/20000: Accuracy = 0.3824
Epoch 18862/20000: Accuracy = 0.6176
Epoch 18863/20000: Accuracy = 0.4632
Epoch 18864/20000: Accuracy = 0.4485
Epoch 18865/20000: Accuracy = 0.6103
Epoch 18866/20000: Accuracy = 0.6250
Epoch 18867/20000: Accuracy = 0.5588
Epoch 18868/20000: Accuracy = 0.5809
Epoch 18869/20000: Accuracy = 0.4485
Epoch 18870/20000: Accuracy = 0.3971
Epoch 18871/20000: Accuracy = 0.4632
Epoch 18872/20000: Accuracy = 0.6250
```

```
Epoch 18873/20000: Accuracy = 0.6103
Epoch 18874/20000: Accuracy = 0.5809
Epoch 18875/20000: Accuracy = 0.3824
Epoch 18876/20000: Accuracy = 0.3676
Epoch 18877/20000: Accuracy = 0.3235
Epoch 18878/20000: Accuracy = 0.5809
Epoch 18879/20000: Accuracy = 0.4265
Epoch 18880/20000: Accuracy = 0.3750
Epoch 18881/20000: Accuracy = 0.3897
Epoch 18882/20000: Accuracy = 0.3382
Epoch 18883/20000: Accuracy = 0.4559
Epoch 18884/20000: Accuracy = 0.3971
Epoch 18885/20000: Accuracy = 0.6250
Epoch 18886/20000: Accuracy = 0.5662
Epoch 18887/20000: Accuracy = 0.4485
Epoch 18888/20000: Accuracy = 0.6250
Epoch 18889/20000: Accuracy = 0.3824
Epoch 18890/20000: Accuracy = 0.3235
Epoch 18891/20000: Accuracy = 0.6103
Epoch 18892/20000: Accuracy = 0.3971
Epoch 18893/20000: Accuracy = 0.5809
Epoch 18894/20000: Accuracy = 0.5956
Epoch 18895/20000: Accuracy = 0.6176
Epoch 18896/20000: Accuracy = 0.4265
Epoch 18897/20000: Accuracy = 0.6250
Epoch 18898/20000: Accuracy = 0.5882
Epoch 18899/20000: Accuracy = 0.6250
Epoch 18900/20000: Accuracy = 0.3897
Epoch 18901/20000: Accuracy = 0.6250
Epoch 18902/20000: Accuracy = 0.6176
Epoch 18903/20000: Accuracy = 0.5662
Epoch 18904/20000: Accuracy = 0.3750
Epoch 18905/20000: Accuracy = 0.5882
Epoch 18906/20000: Accuracy = 0.3750
Epoch 18907/20000: Accuracy = 0.3676
Epoch 18908/20000: Accuracy = 0.5809
Epoch 18909/20000: Accuracy = 0.3824
Epoch 18910/20000: Accuracy = 0.6250
Epoch 18911/20000: Accuracy = 0.3897
Epoch 18912/20000: Accuracy = 0.6250
Epoch 18913/20000: Accuracy = 0.5294
Epoch 18914/20000: Accuracy = 0.5294
Epoch 18915/20000: Accuracy = 0.6250
Epoch 18916/20000: Accuracy = 0.6250
Epoch 18917/20000: Accuracy = 0.3676
Epoch 18918/20000: Accuracy = 0.3824
Epoch 18919/20000: Accuracy = 0.3897
Epoch 18920/20000: Accuracy = 0.4044
```

```
Epoch 18921/20000: Accuracy = 0.5588
Epoch 18922/20000: Accuracy = 0.6250
Epoch 18923/20000: Accuracy = 0.4044
Epoch 18924/20000: Accuracy = 0.6103
Epoch 18925/20000: Accuracy = 0.3676
Epoch 18926/20000: Accuracy = 0.4044
Epoch 18927/20000: Accuracy = 0.5882
Epoch 18928/20000: Accuracy = 0.6250
Epoch 18929/20000: Accuracy = 0.3750
Epoch 18930/20000: Accuracy = 0.6250
Epoch 18931/20000: Accuracy = 0.6691
Epoch 18932/20000: Accuracy = 0.6103
Epoch 18933/20000: Accuracy = 0.3824
Epoch 18934/20000: Accuracy = 0.5882
Epoch 18935/20000: Accuracy = 0.5882
Epoch 18936/20000: Accuracy = 0.3750
Epoch 18937/20000: Accuracy = 0.6618
Epoch 18938/20000: Accuracy = 0.5221
Epoch 18939/20000: Accuracy = 0.5294
Epoch 18940/20000: Accuracy = 0.6029
Epoch 18941/20000: Accuracy = 0.3750
Epoch 18942/20000: Accuracy = 0.3750
Epoch 18943/20000: Accuracy = 0.3750
Epoch 18944/20000: Accuracy = 0.5515
Epoch 18945/20000: Accuracy = 0.4853
Epoch 18946/20000: Accuracy = 0.4412
Epoch 18947/20000: Accuracy = 0.3235
Epoch 18948/20000: Accuracy = 0.3750
Epoch 18949/20000: Accuracy = 0.6176
Epoch 18950/20000: Accuracy = 0.3529
Epoch 18951/20000: Accuracy = 0.6176
Epoch 18952/20000: Accuracy = 0.3015
Epoch 18953/20000: Accuracy = 0.5074
Epoch 18954/20000: Accuracy = 0.6176
Epoch 18955/20000: Accuracy = 0.3897
Epoch 18956/20000: Accuracy = 0.6838
Epoch 18957/20000: Accuracy = 0.6176
Epoch 18958/20000: Accuracy = 0.4044
Epoch 18959/20000: Accuracy = 0.3456
Epoch 18960/20000: Accuracy = 0.4044
Epoch 18961/20000: Accuracy = 0.6250
Epoch 18962/20000: Accuracy = 0.6176
Epoch 18963/20000: Accuracy = 0.6397
Epoch 18964/20000: Accuracy = 0.6250
Epoch 18965/20000: Accuracy = 0.5662
Epoch 18966/20000: Accuracy = 0.5588
Epoch 18967/20000: Accuracy = 0.3971
Epoch 18968/20000: Accuracy = 0.3750
```

```
Epoch 18969/20000: Accuracy = 0.4191
Epoch 18970/20000: Accuracy = 0.3456
Epoch 18971/20000: Accuracy = 0.3897
Epoch 18972/20000: Accuracy = 0.5735
Epoch 18973/20000: Accuracy = 0.6103
Epoch 18974/20000: Accuracy = 0.6176
Epoch 18975/20000: Accuracy = 0.6176
Epoch 18976/20000: Accuracy = 0.3824
Epoch 18977/20000: Accuracy = 0.3750
Epoch 18978/20000: Accuracy = 0.3750
Epoch 18979/20000: Accuracy = 0.5000
Epoch 18980/20000: Accuracy = 0.5662
Epoch 18981/20000: Accuracy = 0.6250
Epoch 18982/20000: Accuracy = 0.3824
Epoch 18983/20000: Accuracy = 0.5515
Epoch 18984/20000: Accuracy = 0.6250
Epoch 18985/20000: Accuracy = 0.3824
Epoch 18986/20000: Accuracy = 0.5956
Epoch 18987/20000: Accuracy = 0.3750
Epoch 18988/20000: Accuracy = 0.6618
Epoch 18989/20000: Accuracy = 0.3897
Epoch 18990/20000: Accuracy = 0.3750
Epoch 18991/20000: Accuracy = 0.4044
Epoch 18992/20000: Accuracy = 0.3897
Epoch 18993/20000: Accuracy = 0.3897
Epoch 18994/20000: Accuracy = 0.3603
Epoch 18995/20000: Accuracy = 0.6324
Epoch 18996/20000: Accuracy = 0.6250
Epoch 18997/20000: Accuracy = 0.5882
Epoch 18998/20000: Accuracy = 0.3750
Epoch 18999/20000: Accuracy = 0.3750
Epoch 19000/20000: Accuracy = 0.2868
Epoch 19001/20000: Accuracy = 0.4412
Epoch 19002/20000: Accuracy = 0.3750
Epoch 19003/20000: Accuracy = 0.6324
Epoch 19004/20000: Accuracy = 0.3750
Epoch 19005/20000: Accuracy = 0.4485
Epoch 19006/20000: Accuracy = 0.3750
Epoch 19007/20000: Accuracy = 0.3750
Epoch 19008/20000: Accuracy = 0.4559
Epoch 19009/20000: Accuracy = 0.3750
Epoch 19010/20000: Accuracy = 0.5735
Epoch 19011/20000: Accuracy = 0.6029
Epoch 19012/20000: Accuracy = 0.3750
Epoch 19013/20000: Accuracy = 0.5882
Epoch 19014/20000: Accuracy = 0.3971
Epoch 19015/20000: Accuracy = 0.3750
Epoch 19016/20000: Accuracy = 0.6176
```

```
Epoch 19017/20000: Accuracy = 0.3750
Epoch 19018/20000: Accuracy = 0.6250
Epoch 19019/20000: Accuracy = 0.4044
Epoch 19020/20000: Accuracy = 0.5956
Epoch 19021/20000: Accuracy = 0.6324
Epoch 19022/20000: Accuracy = 0.3235
Epoch 19023/20000: Accuracy = 0.4412
Epoch 19024/20000: Accuracy = 0.4044
Epoch 19025/20000: Accuracy = 0.4559
Epoch 19026/20000: Accuracy = 0.3456
Epoch 19027/20000: Accuracy = 0.6397
Epoch 19028/20000: Accuracy = 0.5441
Epoch 19029/20000: Accuracy = 0.5662
Epoch 19030/20000: Accuracy = 0.4632
Epoch 19031/20000: Accuracy = 0.3824
Epoch 19032/20000: Accuracy = 0.5515
Epoch 19033/20000: Accuracy = 0.3824
Epoch 19034/20000: Accuracy = 0.4853
Epoch 19035/20000: Accuracy = 0.5221
Epoch 19036/20000: Accuracy = 0.6103
Epoch 19037/20000: Accuracy = 0.6176
Epoch 19038/20000: Accuracy = 0.3603
Epoch 19039/20000: Accuracy = 0.3309
Epoch 19040/20000: Accuracy = 0.3897
Epoch 19041/20000: Accuracy = 0.6029
Epoch 19042/20000: Accuracy = 0.5809
Epoch 19043/20000: Accuracy = 0.3750
Epoch 19044/20000: Accuracy = 0.5368
Epoch 19045/20000: Accuracy = 0.4191
Epoch 19046/20000: Accuracy = 0.6103
Epoch 19047/20000: Accuracy = 0.6324
Epoch 19048/20000: Accuracy = 0.5882
Epoch 19049/20000: Accuracy = 0.5956
Epoch 19050/20000: Accuracy = 0.4338
Epoch 19051/20000: Accuracy = 0.5882
Epoch 19052/20000: Accuracy = 0.3971
Epoch 19053/20000: Accuracy = 0.6250
Epoch 19054/20000: Accuracy = 0.6250
Epoch 19055/20000: Accuracy = 0.3750
Epoch 19056/20000: Accuracy = 0.3015
Epoch 19057/20000: Accuracy = 0.5662
Epoch 19058/20000: Accuracy = 0.4044
Epoch 19059/20000: Accuracy = 0.5956
Epoch 19060/20000: Accuracy = 0.6324
Epoch 19061/20000: Accuracy = 0.4044
Epoch 19062/20000: Accuracy = 0.6250
Epoch 19063/20000: Accuracy = 0.6103
Epoch 19064/20000: Accuracy = 0.4191
```

```
Epoch 19065/20000: Accuracy = 0.3750
Epoch 19066/20000: Accuracy = 0.6103
Epoch 19067/20000: Accuracy = 0.3750
Epoch 19068/20000: Accuracy = 0.4191
Epoch 19069/20000: Accuracy = 0.3750
Epoch 19070/20000: Accuracy = 0.5588
Epoch 19071/20000: Accuracy = 0.3603
Epoch 19072/20000: Accuracy = 0.6324
Epoch 19073/20000: Accuracy = 0.6250
Epoch 19074/20000: Accuracy = 0.6397
Epoch 19075/20000: Accuracy = 0.3897
Epoch 19076/20000: Accuracy = 0.5662
Epoch 19077/20000: Accuracy = 0.5515
Epoch 19078/20000: Accuracy = 0.4853
Epoch 19079/20000: Accuracy = 0.3750
Epoch 19080/20000: Accuracy = 0.4632
Epoch 19081/20000: Accuracy = 0.3750
Epoch 19082/20000: Accuracy = 0.6103
Epoch 19083/20000: Accuracy = 0.3603
Epoch 19084/20000: Accuracy = 0.3750
Epoch 19085/20000: Accuracy = 0.3750
Epoch 19086/20000: Accuracy = 0.6544
Epoch 19087/20000: Accuracy = 0.6176
Epoch 19088/20000: Accuracy = 0.3971
Epoch 19089/20000: Accuracy = 0.5221
Epoch 19090/20000: Accuracy = 0.6103
Epoch 19091/20000: Accuracy = 0.5000
Epoch 19092/20000: Accuracy = 0.6250
Epoch 19093/20000: Accuracy = 0.6103
Epoch 19094/20000: Accuracy = 0.3824
Epoch 19095/20000: Accuracy = 0.6103
Epoch 19096/20000: Accuracy = 0.4779
Epoch 19097/20000: Accuracy = 0.6176
Epoch 19098/20000: Accuracy = 0.3750
Epoch 19099/20000: Accuracy = 0.5221
Epoch 19100/20000: Accuracy = 0.5441
Epoch 19101/20000: Accuracy = 0.6176
Epoch 19102/20000: Accuracy = 0.4191
Epoch 19103/20000: Accuracy = 0.4559
Epoch 19104/20000: Accuracy = 0.3750
Epoch 19105/20000: Accuracy = 0.3824
Epoch 19106/20000: Accuracy = 0.5368
Epoch 19107/20000: Accuracy = 0.3824
Epoch 19108/20000: Accuracy = 0.5882
Epoch 19109/20000: Accuracy = 0.3750
Epoch 19110/20000: Accuracy = 0.5368
Epoch 19111/20000: Accuracy = 0.3971
Epoch 19112/20000: Accuracy = 0.5956
```

```
Epoch 19113/20000: Accuracy = 0.6250
Epoch 19114/20000: Accuracy = 0.6029
Epoch 19115/20000: Accuracy = 0.3824
Epoch 19116/20000: Accuracy = 0.6250
Epoch 19117/20000: Accuracy = 0.4044
Epoch 19118/20000: Accuracy = 0.6103
Epoch 19119/20000: Accuracy = 0.3824
Epoch 19120/20000: Accuracy = 0.5809
Epoch 19121/20000: Accuracy = 0.3824
Epoch 19122/20000: Accuracy = 0.4118
Epoch 19123/20000: Accuracy = 0.5074
Epoch 19124/20000: Accuracy = 0.3897
Epoch 19125/20000: Accuracy = 0.6029
Epoch 19126/20000: Accuracy = 0.6250
Epoch 19127/20000: Accuracy = 0.6176
Epoch 19128/20000: Accuracy = 0.4265
Epoch 19129/20000: Accuracy = 0.6176
Epoch 19130/20000: Accuracy = 0.3897
Epoch 19131/20000: Accuracy = 0.4338
Epoch 19132/20000: Accuracy = 0.3750
Epoch 19133/20000: Accuracy = 0.3750
Epoch 19134/20000: Accuracy = 0.6250
Epoch 19135/20000: Accuracy = 0.6250
Epoch 19136/20000: Accuracy = 0.3750
Epoch 19137/20000: Accuracy = 0.3824
Epoch 19138/20000: Accuracy = 0.4191
Epoch 19139/20000: Accuracy = 0.6250
Epoch 19140/20000: Accuracy = 0.4338
Epoch 19141/20000: Accuracy = 0.4706
Epoch 19142/20000: Accuracy = 0.6250
Epoch 19143/20000: Accuracy = 0.6029
Epoch 19144/20000: Accuracy = 0.3676
Epoch 19145/20000: Accuracy = 0.5735
Epoch 19146/20000: Accuracy = 0.4926
Epoch 19147/20000: Accuracy = 0.6103
Epoch 19148/20000: Accuracy = 0.6250
Epoch 19149/20000: Accuracy = 0.5147
Epoch 19150/20000: Accuracy = 0.6250
Epoch 19151/20000: Accuracy = 0.3750
Epoch 19152/20000: Accuracy = 0.6250
Epoch 19153/20000: Accuracy = 0.4118
Epoch 19154/20000: Accuracy = 0.6176
Epoch 19155/20000: Accuracy = 0.4118
Epoch 19156/20000: Accuracy = 0.6250
Epoch 19157/20000: Accuracy = 0.6324
Epoch 19158/20000: Accuracy = 0.3824
Epoch 19159/20000: Accuracy = 0.6103
Epoch 19160/20000: Accuracy = 0.3824
```

```
Epoch 19161/20000: Accuracy = 0.3824
Epoch 19162/20000: Accuracy = 0.3529
Epoch 19163/20000: Accuracy = 0.4044
Epoch 19164/20000: Accuracy = 0.3529
Epoch 19165/20000: Accuracy = 0.6176
Epoch 19166/20000: Accuracy = 0.5956
Epoch 19167/20000: Accuracy = 0.6250
Epoch 19168/20000: Accuracy = 0.6103
Epoch 19169/20000: Accuracy = 0.4265
Epoch 19170/20000: Accuracy = 0.5882
Epoch 19171/20000: Accuracy = 0.4559
Epoch 19172/20000: Accuracy = 0.6250
Epoch 19173/20000: Accuracy = 0.3603
Epoch 19174/20000: Accuracy = 0.5441
Epoch 19175/20000: Accuracy = 0.3750
Epoch 19176/20000: Accuracy = 0.2941
Epoch 19177/20000: Accuracy = 0.3750
Epoch 19178/20000: Accuracy = 0.4559
Epoch 19179/20000: Accuracy = 0.6691
Epoch 19180/20000: Accuracy = 0.4044
Epoch 19181/20000: Accuracy = 0.4118
Epoch 19182/20000: Accuracy = 0.3603
Epoch 19183/20000: Accuracy = 0.4779
Epoch 19184/20000: Accuracy = 0.3382
Epoch 19185/20000: Accuracy = 0.6618
Epoch 19186/20000: Accuracy = 0.4412
Epoch 19187/20000: Accuracy = 0.5074
Epoch 19188/20000: Accuracy = 0.6471
Epoch 19189/20000: Accuracy = 0.4265
Epoch 19190/20000: Accuracy = 0.3750
Epoch 19191/20000: Accuracy = 0.3162
Epoch 19192/20000: Accuracy = 0.7132
Epoch 19193/20000: Accuracy = 0.5809
Epoch 19194/20000: Accuracy = 0.6176
Epoch 19195/20000: Accuracy = 0.6176
Epoch 19196/20000: Accuracy = 0.4118
Epoch 19197/20000: Accuracy = 0.6618
Epoch 19198/20000: Accuracy = 0.3750
Epoch 19199/20000: Accuracy = 0.4044
Epoch 19200/20000: Accuracy = 0.3824
Epoch 19201/20000: Accuracy = 0.6397
Epoch 19202/20000: Accuracy = 0.4338
Epoch 19203/20000: Accuracy = 0.6103
Epoch 19204/20000: Accuracy = 0.6250
Epoch 19205/20000: Accuracy = 0.3676
Epoch 19206/20000: Accuracy = 0.7059
Epoch 19207/20000: Accuracy = 0.4044
Epoch 19208/20000: Accuracy = 0.6250
```

```
Epoch 19209/20000: Accuracy = 0.6324
Epoch 19210/20000: Accuracy = 0.4485
Epoch 19211/20000: Accuracy = 0.3824
Epoch 19212/20000: Accuracy = 0.3897
Epoch 19213/20000: Accuracy = 0.4559
Epoch 19214/20000: Accuracy = 0.5147
Epoch 19215/20000: Accuracy = 0.3750
Epoch 19216/20000: Accuracy = 0.5441
Epoch 19217/20000: Accuracy = 0.2794
Epoch 19218/20000: Accuracy = 0.6176
Epoch 19219/20000: Accuracy = 0.3824
Epoch 19220/20000: Accuracy = 0.5588
Epoch 19221/20000: Accuracy = 0.3750
Epoch 19222/20000: Accuracy = 0.6250
Epoch 19223/20000: Accuracy = 0.6250
Epoch 19224/20000: Accuracy = 0.5221
Epoch 19225/20000: Accuracy = 0.3824
Epoch 19226/20000: Accuracy = 0.5735
Epoch 19227/20000: Accuracy = 0.6250
Epoch 19228/20000: Accuracy = 0.6029
Epoch 19229/20000: Accuracy = 0.3750
Epoch 19230/20000: Accuracy = 0.6103
Epoch 19231/20000: Accuracy = 0.3750
Epoch 19232/20000: Accuracy = 0.6176
Epoch 19233/20000: Accuracy = 0.5368
Epoch 19234/20000: Accuracy = 0.6176
Epoch 19235/20000: Accuracy = 0.6250
Epoch 19236/20000: Accuracy = 0.3824
Epoch 19237/20000: Accuracy = 0.5294
Epoch 19238/20000: Accuracy = 0.4044
Epoch 19239/20000: Accuracy = 0.5882
Epoch 19240/20000: Accuracy = 0.6029
Epoch 19241/20000: Accuracy = 0.5368
Epoch 19242/20000: Accuracy = 0.4853
Epoch 19243/20000: Accuracy = 0.4706
Epoch 19244/20000: Accuracy = 0.5147
Epoch 19245/20000: Accuracy = 0.6397
Epoch 19246/20000: Accuracy = 0.6176
Epoch 19247/20000: Accuracy = 0.4265
Epoch 19248/20000: Accuracy = 0.3750
Epoch 19249/20000: Accuracy = 0.3750
Epoch 19250/20000: Accuracy = 0.3529
Epoch 19251/20000: Accuracy = 0.4706
Epoch 19252/20000: Accuracy = 0.5294
Epoch 19253/20000: Accuracy = 0.6176
Epoch 19254/20000: Accuracy = 0.3750
Epoch 19255/20000: Accuracy = 0.6029
Epoch 19256/20000: Accuracy = 0.5588
```

```
Epoch 19257/20000: Accuracy = 0.5294
Epoch 19258/20000: Accuracy = 0.6544
Epoch 19259/20000: Accuracy = 0.4412
Epoch 19260/20000: Accuracy = 0.5882
Epoch 19261/20000: Accuracy = 0.5809
Epoch 19262/20000: Accuracy = 0.5000
Epoch 19263/20000: Accuracy = 0.5662
Epoch 19264/20000: Accuracy = 0.6176
Epoch 19265/20000: Accuracy = 0.4485
Epoch 19266/20000: Accuracy = 0.5882
Epoch 19267/20000: Accuracy = 0.6250
Epoch 19268/20000: Accuracy = 0.6250
Epoch 19269/20000: Accuracy = 0.3750
Epoch 19270/20000: Accuracy = 0.4191
Epoch 19271/20000: Accuracy = 0.6250
Epoch 19272/20000: Accuracy = 0.6765
Epoch 19273/20000: Accuracy = 0.6250
Epoch 19274/20000: Accuracy = 0.6250
Epoch 19275/20000: Accuracy = 0.5735
Epoch 19276/20000: Accuracy = 0.6176
Epoch 19277/20000: Accuracy = 0.3750
Epoch 19278/20000: Accuracy = 0.3750
Epoch 19279/20000: Accuracy = 0.6103
Epoch 19280/20000: Accuracy = 0.6250
Epoch 19281/20000: Accuracy = 0.6250
Epoch 19282/20000: Accuracy = 0.6029
Epoch 19283/20000: Accuracy = 0.3750
Epoch 19284/20000: Accuracy = 0.6250
Epoch 19285/20000: Accuracy = 0.5662
Epoch 19286/20000: Accuracy = 0.3897
Epoch 19287/20000: Accuracy = 0.6176
Epoch 19288/20000: Accuracy = 0.3750
Epoch 19289/20000: Accuracy = 0.6250
Epoch 19290/20000: Accuracy = 0.5074
Epoch 19291/20000: Accuracy = 0.6176
Epoch 19292/20000: Accuracy = 0.6103
Epoch 19293/20000: Accuracy = 0.6029
Epoch 19294/20000: Accuracy = 0.6176
Epoch 19295/20000: Accuracy = 0.3235
Epoch 19296/20000: Accuracy = 0.4265
Epoch 19297/20000: Accuracy = 0.5882
Epoch 19298/20000: Accuracy = 0.3456
Epoch 19299/20000: Accuracy = 0.6103
Epoch 19300/20000: Accuracy = 0.3824
Epoch 19301/20000: Accuracy = 0.4632
Epoch 19302/20000: Accuracy = 0.6176
Epoch 19303/20000: Accuracy = 0.4044
Epoch 19304/20000: Accuracy = 0.3750
```

```
Epoch 19305/20000: Accuracy = 0.5809
Epoch 19306/20000: Accuracy = 0.5956
Epoch 19307/20000: Accuracy = 0.6176
Epoch 19308/20000: Accuracy = 0.4265
Epoch 19309/20000: Accuracy = 0.3971
Epoch 19310/20000: Accuracy = 0.5074
Epoch 19311/20000: Accuracy = 0.6029
Epoch 19312/20000: Accuracy = 0.6250
Epoch 19313/20000: Accuracy = 0.6250
Epoch 19314/20000: Accuracy = 0.3603
Epoch 19315/20000: Accuracy = 0.3971
Epoch 19316/20000: Accuracy = 0.6397
Epoch 19317/20000: Accuracy = 0.3750
Epoch 19318/20000: Accuracy = 0.4559
Epoch 19319/20000: Accuracy = 0.3750
Epoch 19320/20000: Accuracy = 0.7206
Epoch 19321/20000: Accuracy = 0.3897
Epoch 19322/20000: Accuracy = 0.6176
Epoch 19323/20000: Accuracy = 0.3824
Epoch 19324/20000: Accuracy = 0.6029
Epoch 19325/20000: Accuracy = 0.5515
Epoch 19326/20000: Accuracy = 0.6324
Epoch 19327/20000: Accuracy = 0.3750
Epoch 19328/20000: Accuracy = 0.5441
Epoch 19329/20000: Accuracy = 0.5882
Epoch 19330/20000: Accuracy = 0.3897
Epoch 19331/20000: Accuracy = 0.3750
Epoch 19332/20000: Accuracy = 0.5662
Epoch 19333/20000: Accuracy = 0.3824
Epoch 19334/20000: Accuracy = 0.2794
Epoch 19335/20000: Accuracy = 0.7059
Epoch 19336/20000: Accuracy = 0.6250
Epoch 19337/20000: Accuracy = 0.3750
Epoch 19338/20000: Accuracy = 0.5074
Epoch 19339/20000: Accuracy = 0.6176
Epoch 19340/20000: Accuracy = 0.6103
Epoch 19341/20000: Accuracy = 0.6250
Epoch 19342/20000: Accuracy = 0.6029
Epoch 19343/20000: Accuracy = 0.3824
Epoch 19344/20000: Accuracy = 0.3750
Epoch 19345/20000: Accuracy = 0.4044
Epoch 19346/20000: Accuracy = 0.6103
Epoch 19347/20000: Accuracy = 0.6250
Epoch 19348/20000: Accuracy = 0.5882
Epoch 19349/20000: Accuracy = 0.3750
Epoch 19350/20000: Accuracy = 0.3824
Epoch 19351/20000: Accuracy = 0.4265
Epoch 19352/20000: Accuracy = 0.3824
```

```
Epoch 19353/20000: Accuracy = 0.3971
Epoch 19354/20000: Accuracy = 0.4779
Epoch 19355/20000: Accuracy = 0.4118
Epoch 19356/20000: Accuracy = 0.3971
Epoch 19357/20000: Accuracy = 0.3824
Epoch 19358/20000: Accuracy = 0.5588
Epoch 19359/20000: Accuracy = 0.4485
Epoch 19360/20000: Accuracy = 0.4632
Epoch 19361/20000: Accuracy = 0.3750
Epoch 19362/20000: Accuracy = 0.6250
Epoch 19363/20000: Accuracy = 0.6544
Epoch 19364/20000: Accuracy = 0.5956
Epoch 19365/20000: Accuracy = 0.3971
Epoch 19366/20000: Accuracy = 0.6250
Epoch 19367/20000: Accuracy = 0.6176
Epoch 19368/20000: Accuracy = 0.4044
Epoch 19369/20000: Accuracy = 0.3824
Epoch 19370/20000: Accuracy = 0.6250
Epoch 19371/20000: Accuracy = 0.6250
Epoch 19372/20000: Accuracy = 0.5809
Epoch 19373/20000: Accuracy = 0.3824
Epoch 19374/20000: Accuracy = 0.4044
Epoch 19375/20000: Accuracy = 0.6544
Epoch 19376/20000: Accuracy = 0.5074
Epoch 19377/20000: Accuracy = 0.3162
Epoch 19378/20000: Accuracy = 0.3897
Epoch 19379/20000: Accuracy = 0.3750
Epoch 19380/20000: Accuracy = 0.6176
Epoch 19381/20000: Accuracy = 0.4338
Epoch 19382/20000: Accuracy = 0.3824
Epoch 19383/20000: Accuracy = 0.4044
Epoch 19384/20000: Accuracy = 0.6397
Epoch 19385/20000: Accuracy = 0.3750
Epoch 19386/20000: Accuracy = 0.5294
Epoch 19387/20000: Accuracy = 0.5956
Epoch 19388/20000: Accuracy = 0.6029
Epoch 19389/20000: Accuracy = 0.3824
Epoch 19390/20000: Accuracy = 0.5956
Epoch 19391/20000: Accuracy = 0.4338
Epoch 19392/20000: Accuracy = 0.6103
Epoch 19393/20000: Accuracy = 0.5956
Epoch 19394/20000: Accuracy = 0.4044
Epoch 19395/20000: Accuracy = 0.5735
Epoch 19396/20000: Accuracy = 0.5515
Epoch 19397/20000: Accuracy = 0.4044
Epoch 19398/20000: Accuracy = 0.6176
Epoch 19399/20000: Accuracy = 0.4485
Epoch 19400/20000: Accuracy = 0.3897
```

```
Epoch 19401/20000: Accuracy = 0.3897
Epoch 19402/20000: Accuracy = 0.6176
Epoch 19403/20000: Accuracy = 0.6250
Epoch 19404/20000: Accuracy = 0.3824
Epoch 19405/20000: Accuracy = 0.5515
Epoch 19406/20000: Accuracy = 0.6250
Epoch 19407/20000: Accuracy = 0.4118
Epoch 19408/20000: Accuracy = 0.6544
Epoch 19409/20000: Accuracy = 0.4853
Epoch 19410/20000: Accuracy = 0.6250
Epoch 19411/20000: Accuracy = 0.3824
Epoch 19412/20000: Accuracy = 0.4338
Epoch 19413/20000: Accuracy = 0.6250
Epoch 19414/20000: Accuracy = 0.3750
Epoch 19415/20000: Accuracy = 0.6324
Epoch 19416/20000: Accuracy = 0.6176
Epoch 19417/20000: Accuracy = 0.6250
Epoch 19418/20000: Accuracy = 0.6176
Epoch 19419/20000: Accuracy = 0.6544
Epoch 19420/20000: Accuracy = 0.6324
Epoch 19421/20000: Accuracy = 0.3456
Epoch 19422/20000: Accuracy = 0.4559
Epoch 19423/20000: Accuracy = 0.3750
Epoch 19424/20000: Accuracy = 0.5368
Epoch 19425/20000: Accuracy = 0.3897
Epoch 19426/20000: Accuracy = 0.6176
Epoch 19427/20000: Accuracy = 0.6176
Epoch 19428/20000: Accuracy = 0.4044
Epoch 19429/20000: Accuracy = 0.6029
Epoch 19430/20000: Accuracy = 0.4191
Epoch 19431/20000: Accuracy = 0.4853
Epoch 19432/20000: Accuracy = 0.3529
Epoch 19433/20000: Accuracy = 0.3824
Epoch 19434/20000: Accuracy = 0.3750
Epoch 19435/20000: Accuracy = 0.6250
Epoch 19436/20000: Accuracy = 0.6397
Epoch 19437/20000: Accuracy = 0.6324
Epoch 19438/20000: Accuracy = 0.3750
Epoch 19439/20000: Accuracy = 0.6103
Epoch 19440/20000: Accuracy = 0.3971
Epoch 19441/20000: Accuracy = 0.6691
Epoch 19442/20000: Accuracy = 0.6250
Epoch 19443/20000: Accuracy = 0.3897
Epoch 19444/20000: Accuracy = 0.3824
Epoch 19445/20000: Accuracy = 0.3750
Epoch 19446/20000: Accuracy = 0.4559
Epoch 19447/20000: Accuracy = 0.6250
Epoch 19448/20000: Accuracy = 0.3750
```

```
Epoch 19449/20000: Accuracy = 0.3897
Epoch 19450/20000: Accuracy = 0.5956
Epoch 19451/20000: Accuracy = 0.3971
Epoch 19452/20000: Accuracy = 0.5662
Epoch 19453/20000: Accuracy = 0.6250
Epoch 19454/20000: Accuracy = 0.5956
Epoch 19455/20000: Accuracy = 0.6103
Epoch 19456/20000: Accuracy = 0.6029
Epoch 19457/20000: Accuracy = 0.3897
Epoch 19458/20000: Accuracy = 0.6250
Epoch 19459/20000: Accuracy = 0.4191
Epoch 19460/20000: Accuracy = 0.4265
Epoch 19461/20000: Accuracy = 0.3603
Epoch 19462/20000: Accuracy = 0.6250
Epoch 19463/20000: Accuracy = 0.6176
Epoch 19464/20000: Accuracy = 0.4926
Epoch 19465/20000: Accuracy = 0.4559
Epoch 19466/20000: Accuracy = 0.3897
Epoch 19467/20000: Accuracy = 0.4118
Epoch 19468/20000: Accuracy = 0.3897
Epoch 19469/20000: Accuracy = 0.6471
Epoch 19470/20000: Accuracy = 0.3824
Epoch 19471/20000: Accuracy = 0.4338
Epoch 19472/20000: Accuracy = 0.4853
Epoch 19473/20000: Accuracy = 0.6103
Epoch 19474/20000: Accuracy = 0.3824
Epoch 19475/20000: Accuracy = 0.6103
Epoch 19476/20000: Accuracy = 0.3603
Epoch 19477/20000: Accuracy = 0.3750
Epoch 19478/20000: Accuracy = 0.4338
Epoch 19479/20000: Accuracy = 0.3897
Epoch 19480/20000: Accuracy = 0.6176
Epoch 19481/20000: Accuracy = 0.4044
Epoch 19482/20000: Accuracy = 0.6176
Epoch 19483/20000: Accuracy = 0.3750
Epoch 19484/20000: Accuracy = 0.6176
Epoch 19485/20000: Accuracy = 0.3750
Epoch 19486/20000: Accuracy = 0.4338
Epoch 19487/20000: Accuracy = 0.5956
Epoch 19488/20000: Accuracy = 0.4044
Epoch 19489/20000: Accuracy = 0.3676
Epoch 19490/20000: Accuracy = 0.5515
Epoch 19491/20000: Accuracy = 0.6691
Epoch 19492/20000: Accuracy = 0.6250
Epoch 19493/20000: Accuracy = 0.5809
Epoch 19494/20000: Accuracy = 0.5809
Epoch 19495/20000: Accuracy = 0.3897
Epoch 19496/20000: Accuracy = 0.3676
```

```
Epoch 19497/20000: Accuracy = 0.6250
Epoch 19498/20000: Accuracy = 0.3971
Epoch 19499/20000: Accuracy = 0.3897
Epoch 19500/20000: Accuracy = 0.3750
Epoch 19501/20000: Accuracy = 0.3676
Epoch 19502/20000: Accuracy = 0.3750
Epoch 19503/20000: Accuracy = 0.3824
Epoch 19504/20000: Accuracy = 0.5809
Epoch 19505/20000: Accuracy = 0.6250
Epoch 19506/20000: Accuracy = 0.6103
Epoch 19507/20000: Accuracy = 0.4926
Epoch 19508/20000: Accuracy = 0.4265
Epoch 19509/20000: Accuracy = 0.3676
Epoch 19510/20000: Accuracy = 0.6103
Epoch 19511/20000: Accuracy = 0.3676
Epoch 19512/20000: Accuracy = 0.6250
Epoch 19513/20000: Accuracy = 0.5294
Epoch 19514/20000: Accuracy = 0.6103
Epoch 19515/20000: Accuracy = 0.3824
Epoch 19516/20000: Accuracy = 0.3971
Epoch 19517/20000: Accuracy = 0.3824
Epoch 19518/20000: Accuracy = 0.3824
Epoch 19519/20000: Accuracy = 0.6250
Epoch 19520/20000: Accuracy = 0.6176
Epoch 19521/20000: Accuracy = 0.5000
Epoch 19522/20000: Accuracy = 0.3750
Epoch 19523/20000: Accuracy = 0.6176
Epoch 19524/20000: Accuracy = 0.3750
Epoch 19525/20000: Accuracy = 0.6103
Epoch 19526/20000: Accuracy = 0.3529
Epoch 19527/20000: Accuracy = 0.5294
Epoch 19528/20000: Accuracy = 0.2721
Epoch 19529/20000: Accuracy = 0.5956
Epoch 19530/20000: Accuracy = 0.7426
Epoch 19531/20000: Accuracy = 0.3750
Epoch 19532/20000: Accuracy = 0.4485
Epoch 19533/20000: Accuracy = 0.3750
Epoch 19534/20000: Accuracy = 0.4338
Epoch 19535/20000: Accuracy = 0.6324
Epoch 19536/20000: Accuracy = 0.3824
Epoch 19537/20000: Accuracy = 0.3824
Epoch 19538/20000: Accuracy = 0.4044
Epoch 19539/20000: Accuracy = 0.6250
Epoch 19540/20000: Accuracy = 0.5515
Epoch 19541/20000: Accuracy = 0.6176
Epoch 19542/20000: Accuracy = 0.4779
Epoch 19543/20000: Accuracy = 0.6029
Epoch 19544/20000: Accuracy = 0.3529
```

```
Epoch 19545/20000: Accuracy = 0.4044
Epoch 19546/20000: Accuracy = 0.3676
Epoch 19547/20000: Accuracy = 0.3750
Epoch 19548/20000: Accuracy = 0.3750
Epoch 19549/20000: Accuracy = 0.6765
Epoch 19550/20000: Accuracy = 0.4118
Epoch 19551/20000: Accuracy = 0.4265
Epoch 19552/20000: Accuracy = 0.4044
Epoch 19553/20000: Accuracy = 0.3971
Epoch 19554/20000: Accuracy = 0.3750
Epoch 19555/20000: Accuracy = 0.6250
Epoch 19556/20000: Accuracy = 0.3824
Epoch 19557/20000: Accuracy = 0.4265
Epoch 19558/20000: Accuracy = 0.6176
Epoch 19559/20000: Accuracy = 0.6176
Epoch 19560/20000: Accuracy = 0.5882
Epoch 19561/20000: Accuracy = 0.3824
Epoch 19562/20000: Accuracy = 0.5735
Epoch 19563/20000: Accuracy = 0.5662
Epoch 19564/20000: Accuracy = 0.3750
Epoch 19565/20000: Accuracy = 0.5735
Epoch 19566/20000: Accuracy = 0.3824
Epoch 19567/20000: Accuracy = 0.3824
Epoch 19568/20000: Accuracy = 0.6103
Epoch 19569/20000: Accuracy = 0.6250
Epoch 19570/20000: Accuracy = 0.3750
Epoch 19571/20000: Accuracy = 0.6250
Epoch 19572/20000: Accuracy = 0.4412
Epoch 19573/20000: Accuracy = 0.5515
Epoch 19574/20000: Accuracy = 0.4632
Epoch 19575/20000: Accuracy = 0.3750
Epoch 19576/20000: Accuracy = 0.6176
Epoch 19577/20000: Accuracy = 0.6250
Epoch 19578/20000: Accuracy = 0.4118
Epoch 19579/20000: Accuracy = 0.4926
Epoch 19580/20000: Accuracy = 0.5662
Epoch 19581/20000: Accuracy = 0.3015
Epoch 19582/20000: Accuracy = 0.5956
Epoch 19583/20000: Accuracy = 0.6176
Epoch 19584/20000: Accuracy = 0.3750
Epoch 19585/20000: Accuracy = 0.6176
Epoch 19586/20000: Accuracy = 0.6176
Epoch 19587/20000: Accuracy = 0.5882
Epoch 19588/20000: Accuracy = 0.5294
Epoch 19589/20000: Accuracy = 0.6250
Epoch 19590/20000: Accuracy = 0.3750
Epoch 19591/20000: Accuracy = 0.4706
Epoch 19592/20000: Accuracy = 0.4118
```

```
Epoch 19593/20000: Accuracy = 0.6029
Epoch 19594/20000: Accuracy = 0.5662
Epoch 19595/20000: Accuracy = 0.3824
Epoch 19596/20000: Accuracy = 0.6250
Epoch 19597/20000: Accuracy = 0.6176
Epoch 19598/20000: Accuracy = 0.4044
Epoch 19599/20000: Accuracy = 0.6176
Epoch 19600/20000: Accuracy = 0.3897
Epoch 19601/20000: Accuracy = 0.5662
Epoch 19602/20000: Accuracy = 0.6397
Epoch 19603/20000: Accuracy = 0.6176
Epoch 19604/20000: Accuracy = 0.6103
Epoch 19605/20000: Accuracy = 0.2941
Epoch 19606/20000: Accuracy = 0.6250
Epoch 19607/20000: Accuracy = 0.4853
Epoch 19608/20000: Accuracy = 0.3750
Epoch 19609/20000: Accuracy = 0.4338
Epoch 19610/20000: Accuracy = 0.3897
Epoch 19611/20000: Accuracy = 0.3971
Epoch 19612/20000: Accuracy = 0.6250
Epoch 19613/20000: Accuracy = 0.7059
Epoch 19614/20000: Accuracy = 0.6324
Epoch 19615/20000: Accuracy = 0.5882
Epoch 19616/20000: Accuracy = 0.6103
Epoch 19617/20000: Accuracy = 0.3971
Epoch 19618/20000: Accuracy = 0.3676
Epoch 19619/20000: Accuracy = 0.4118
Epoch 19620/20000: Accuracy = 0.4265
Epoch 19621/20000: Accuracy = 0.3824
Epoch 19622/20000: Accuracy = 0.6103
Epoch 19623/20000: Accuracy = 0.6250
Epoch 19624/20000: Accuracy = 0.3750
Epoch 19625/20000: Accuracy = 0.3824
Epoch 19626/20000: Accuracy = 0.6029
Epoch 19627/20000: Accuracy = 0.6176
Epoch 19628/20000: Accuracy = 0.4118
Epoch 19629/20000: Accuracy = 0.6397
Epoch 19630/20000: Accuracy = 0.6471
Epoch 19631/20000: Accuracy = 0.3750
Epoch 19632/20000: Accuracy = 0.5441
Epoch 19633/20000: Accuracy = 0.6324
Epoch 19634/20000: Accuracy = 0.6544
Epoch 19635/20000: Accuracy = 0.6250
Epoch 19636/20000: Accuracy = 0.6029
Epoch 19637/20000: Accuracy = 0.4632
Epoch 19638/20000: Accuracy = 0.3750
Epoch 19639/20000: Accuracy = 0.4044
Epoch 19640/20000: Accuracy = 0.5882
```

```
Epoch 19641/20000: Accuracy = 0.5809
Epoch 19642/20000: Accuracy = 0.5809
Epoch 19643/20000: Accuracy = 0.6324
Epoch 19644/20000: Accuracy = 0.6250
Epoch 19645/20000: Accuracy = 0.3824
Epoch 19646/20000: Accuracy = 0.6324
Epoch 19647/20000: Accuracy = 0.6176
Epoch 19648/20000: Accuracy = 0.4853
Epoch 19649/20000: Accuracy = 0.3897
Epoch 19650/20000: Accuracy = 0.4632
Epoch 19651/20000: Accuracy = 0.6250
Epoch 19652/20000: Accuracy = 0.6176
Epoch 19653/20000: Accuracy = 0.5956
Epoch 19654/20000: Accuracy = 0.5882
Epoch 19655/20000: Accuracy = 0.6176
Epoch 19656/20000: Accuracy = 0.3897
Epoch 19657/20000: Accuracy = 0.6250
Epoch 19658/20000: Accuracy = 0.4485
Epoch 19659/20000: Accuracy = 0.6250
Epoch 19660/20000: Accuracy = 0.6176
Epoch 19661/20000: Accuracy = 0.6029
Epoch 19662/20000: Accuracy = 0.6176
Epoch 19663/20000: Accuracy = 0.6250
Epoch 19664/20000: Accuracy = 0.4485
Epoch 19665/20000: Accuracy = 0.6176
Epoch 19666/20000: Accuracy = 0.4265
Epoch 19667/20000: Accuracy = 0.3750
Epoch 19668/20000: Accuracy = 0.3676
Epoch 19669/20000: Accuracy = 0.6250
Epoch 19670/20000: Accuracy = 0.3971
Epoch 19671/20000: Accuracy = 0.5882
Epoch 19672/20000: Accuracy = 0.4338
Epoch 19673/20000: Accuracy = 0.3750
Epoch 19674/20000: Accuracy = 0.6765
Epoch 19675/20000: Accuracy = 0.4559
Epoch 19676/20000: Accuracy = 0.5368
Epoch 19677/20000: Accuracy = 0.5735
Epoch 19678/20000: Accuracy = 0.3676
Epoch 19679/20000: Accuracy = 0.6103
Epoch 19680/20000: Accuracy = 0.6103
Epoch 19681/20000: Accuracy = 0.3824
Epoch 19682/20000: Accuracy = 0.4779
Epoch 19683/20000: Accuracy = 0.3897
Epoch 19684/20000: Accuracy = 0.5662
Epoch 19685/20000: Accuracy = 0.6838
Epoch 19686/20000: Accuracy = 0.4191
Epoch 19687/20000: Accuracy = 0.3750
Epoch 19688/20000: Accuracy = 0.6176
```

```
Epoch 19689/20000: Accuracy = 0.3456
Epoch 19690/20000: Accuracy = 0.4044
Epoch 19691/20000: Accuracy = 0.3824
Epoch 19692/20000: Accuracy = 0.6176
Epoch 19693/20000: Accuracy = 0.3824
Epoch 19694/20000: Accuracy = 0.4191
Epoch 19695/20000: Accuracy = 0.6250
Epoch 19696/20000: Accuracy = 0.6250
Epoch 19697/20000: Accuracy = 0.3750
Epoch 19698/20000: Accuracy = 0.6029
Epoch 19699/20000: Accuracy = 0.6176
Epoch 19700/20000: Accuracy = 0.6250
Epoch 19701/20000: Accuracy = 0.4118
Epoch 19702/20000: Accuracy = 0.6176
Epoch 19703/20000: Accuracy = 0.3750
Epoch 19704/20000: Accuracy = 0.3824
Epoch 19705/20000: Accuracy = 0.6103
Epoch 19706/20000: Accuracy = 0.5515
Epoch 19707/20000: Accuracy = 0.6250
Epoch 19708/20000: Accuracy = 0.3456
Epoch 19709/20000: Accuracy = 0.5809
Epoch 19710/20000: Accuracy = 0.6397
Epoch 19711/20000: Accuracy = 0.4044
Epoch 19712/20000: Accuracy = 0.5074
Epoch 19713/20000: Accuracy = 0.4559
Epoch 19714/20000: Accuracy = 0.4118
Epoch 19715/20000: Accuracy = 0.3971
Epoch 19716/20000: Accuracy = 0.6029
Epoch 19717/20000: Accuracy = 0.4632
Epoch 19718/20000: Accuracy = 0.5000
Epoch 19719/20000: Accuracy = 0.3824
Epoch 19720/20000: Accuracy = 0.3750
Epoch 19721/20000: Accuracy = 0.3750
Epoch 19722/20000: Accuracy = 0.6250
Epoch 19723/20000: Accuracy = 0.3235
Epoch 19724/20000: Accuracy = 0.3235
Epoch 19725/20000: Accuracy = 0.4118
Epoch 19726/20000: Accuracy = 0.6250
Epoch 19727/20000: Accuracy = 0.3971
Epoch 19728/20000: Accuracy = 0.4191
Epoch 19729/20000: Accuracy = 0.6250
Epoch 19730/20000: Accuracy = 0.6250
Epoch 19731/20000: Accuracy = 0.4044
Epoch 19732/20000: Accuracy = 0.4706
Epoch 19733/20000: Accuracy = 0.3750
Epoch 19734/20000: Accuracy = 0.4412
Epoch 19735/20000: Accuracy = 0.3824
Epoch 19736/20000: Accuracy = 0.5735
```

```
Epoch 19737/20000: Accuracy = 0.6103
Epoch 19738/20000: Accuracy = 0.4265
Epoch 19739/20000: Accuracy = 0.4118
Epoch 19740/20000: Accuracy = 0.6176
Epoch 19741/20000: Accuracy = 0.6103
Epoch 19742/20000: Accuracy = 0.3824
Epoch 19743/20000: Accuracy = 0.6176
Epoch 19744/20000: Accuracy = 0.4853
Epoch 19745/20000: Accuracy = 0.6250
Epoch 19746/20000: Accuracy = 0.6176
Epoch 19747/20000: Accuracy = 0.3971
Epoch 19748/20000: Accuracy = 0.6103
Epoch 19749/20000: Accuracy = 0.6544
Epoch 19750/20000: Accuracy = 0.6103
Epoch 19751/20000: Accuracy = 0.4118
Epoch 19752/20000: Accuracy = 0.5956
Epoch 19753/20000: Accuracy = 0.4118
Epoch 19754/20000: Accuracy = 0.6176
Epoch 19755/20000: Accuracy = 0.5662
Epoch 19756/20000: Accuracy = 0.6103
Epoch 19757/20000: Accuracy = 0.3824
Epoch 19758/20000: Accuracy = 0.3529
Epoch 19759/20000: Accuracy = 0.6250
Epoch 19760/20000: Accuracy = 0.3309
Epoch 19761/20000: Accuracy = 0.3750
Epoch 19762/20000: Accuracy = 0.4118
Epoch 19763/20000: Accuracy = 0.3824
Epoch 19764/20000: Accuracy = 0.6103
Epoch 19765/20000: Accuracy = 0.5662
Epoch 19766/20000: Accuracy = 0.4265
Epoch 19767/20000: Accuracy = 0.4044
Epoch 19768/20000: Accuracy = 0.5000
Epoch 19769/20000: Accuracy = 0.3824
Epoch 19770/20000: Accuracy = 0.3750
Epoch 19771/20000: Accuracy = 0.3897
Epoch 19772/20000: Accuracy = 0.3750
Epoch 19773/20000: Accuracy = 0.3824
Epoch 19774/20000: Accuracy = 0.6029
Epoch 19775/20000: Accuracy = 0.6250
Epoch 19776/20000: Accuracy = 0.6324
Epoch 19777/20000: Accuracy = 0.3750
Epoch 19778/20000: Accuracy = 0.3824
Epoch 19779/20000: Accuracy = 0.3088
Epoch 19780/20000: Accuracy = 0.4044
Epoch 19781/20000: Accuracy = 0.6250
Epoch 19782/20000: Accuracy = 0.6250
Epoch 19783/20000: Accuracy = 0.3750
Epoch 19784/20000: Accuracy = 0.6691
```

```
Epoch 19785/20000: Accuracy = 0.2794
Epoch 19786/20000: Accuracy = 0.3750
Epoch 19787/20000: Accuracy = 0.3824
Epoch 19788/20000: Accuracy = 0.3897
Epoch 19789/20000: Accuracy = 0.3750
Epoch 19790/20000: Accuracy = 0.5662
Epoch 19791/20000: Accuracy = 0.3824
Epoch 19792/20000: Accuracy = 0.3750
Epoch 19793/20000: Accuracy = 0.5000
Epoch 19794/20000: Accuracy = 0.5147
Epoch 19795/20000: Accuracy = 0.3971
Epoch 19796/20000: Accuracy = 0.3824
Epoch 19797/20000: Accuracy = 0.3824
Epoch 19798/20000: Accuracy = 0.6103
Epoch 19799/20000: Accuracy = 0.5956
Epoch 19800/20000: Accuracy = 0.6250
Epoch 19801/20000: Accuracy = 0.5809
Epoch 19802/20000: Accuracy = 0.5515
Epoch 19803/20000: Accuracy = 0.4044
Epoch 19804/20000: Accuracy = 0.6176
Epoch 19805/20000: Accuracy = 0.4118
Epoch 19806/20000: Accuracy = 0.7132
Epoch 19807/20000: Accuracy = 0.3824
Epoch 19808/20000: Accuracy = 0.6250
Epoch 19809/20000: Accuracy = 0.6397
Epoch 19810/20000: Accuracy = 0.6838
Epoch 19811/20000: Accuracy = 0.3824
Epoch 19812/20000: Accuracy = 0.3750
Epoch 19813/20000: Accuracy = 0.3750
Epoch 19814/20000: Accuracy = 0.6250
Epoch 19815/20000: Accuracy = 0.6250
Epoch 19816/20000: Accuracy = 0.4118
Epoch 19817/20000: Accuracy = 0.4265
Epoch 19818/20000: Accuracy = 0.3529
Epoch 19819/20000: Accuracy = 0.3824
Epoch 19820/20000: Accuracy = 0.6176
Epoch 19821/20000: Accuracy = 0.5441
Epoch 19822/20000: Accuracy = 0.4044
Epoch 19823/20000: Accuracy = 0.3971
Epoch 19824/20000: Accuracy = 0.6250
Epoch 19825/20000: Accuracy = 0.4632
Epoch 19826/20000: Accuracy = 0.4191
Epoch 19827/20000: Accuracy = 0.6029
Epoch 19828/20000: Accuracy = 0.5735
Epoch 19829/20000: Accuracy = 0.5735
Epoch 19830/20000: Accuracy = 0.4044
Epoch 19831/20000: Accuracy = 0.5956
Epoch 19832/20000: Accuracy = 0.3750
```

```
Epoch 19833/20000: Accuracy = 0.6250
Epoch 19834/20000: Accuracy = 0.5735
Epoch 19835/20000: Accuracy = 0.5294
Epoch 19836/20000: Accuracy = 0.6250
Epoch 19837/20000: Accuracy = 0.4632
Epoch 19838/20000: Accuracy = 0.3824
Epoch 19839/20000: Accuracy = 0.5441
Epoch 19840/20000: Accuracy = 0.4044
Epoch 19841/20000: Accuracy = 0.5147
Epoch 19842/20000: Accuracy = 0.6544
Epoch 19843/20000: Accuracy = 0.6103
Epoch 19844/20000: Accuracy = 0.6250
Epoch 19845/20000: Accuracy = 0.6250
Epoch 19846/20000: Accuracy = 0.3750
Epoch 19847/20000: Accuracy = 0.3676
Epoch 19848/20000: Accuracy = 0.3897
Epoch 19849/20000: Accuracy = 0.4044
Epoch 19850/20000: Accuracy = 0.4779
Epoch 19851/20000: Accuracy = 0.5956
Epoch 19852/20000: Accuracy = 0.6544
Epoch 19853/20000: Accuracy = 0.6176
Epoch 19854/20000: Accuracy = 0.4485
Epoch 19855/20000: Accuracy = 0.3750
Epoch 19856/20000: Accuracy = 0.3750
Epoch 19857/20000: Accuracy = 0.3824
Epoch 19858/20000: Accuracy = 0.5882
Epoch 19859/20000: Accuracy = 0.5515
Epoch 19860/20000: Accuracy = 0.6176
Epoch 19861/20000: Accuracy = 0.3971
Epoch 19862/20000: Accuracy = 0.3015
Epoch 19863/20000: Accuracy = 0.6029
Epoch 19864/20000: Accuracy = 0.3309
Epoch 19865/20000: Accuracy = 0.4706
Epoch 19866/20000: Accuracy = 0.4485
Epoch 19867/20000: Accuracy = 0.3824
Epoch 19868/20000: Accuracy = 0.4559
Epoch 19869/20000: Accuracy = 0.5956
Epoch 19870/20000: Accuracy = 0.6029
Epoch 19871/20000: Accuracy = 0.6103
Epoch 19872/20000: Accuracy = 0.3750
Epoch 19873/20000: Accuracy = 0.3529
Epoch 19874/20000: Accuracy = 0.5662
Epoch 19875/20000: Accuracy = 0.4559
Epoch 19876/20000: Accuracy = 0.5147
Epoch 19877/20000: Accuracy = 0.6176
Epoch 19878/20000: Accuracy = 0.4044
Epoch 19879/20000: Accuracy = 0.6103
Epoch 19880/20000: Accuracy = 0.3824
```

```
Epoch 19881/20000: Accuracy = 0.5882
Epoch 19882/20000: Accuracy = 0.6176
Epoch 19883/20000: Accuracy = 0.3750
Epoch 19884/20000: Accuracy = 0.3676
Epoch 19885/20000: Accuracy = 0.3824
Epoch 19886/20000: Accuracy = 0.5809
Epoch 19887/20000: Accuracy = 0.6397
Epoch 19888/20000: Accuracy = 0.6250
Epoch 19889/20000: Accuracy = 0.6250
Epoch 19890/20000: Accuracy = 0.6176
Epoch 19891/20000: Accuracy = 0.3897
Epoch 19892/20000: Accuracy = 0.3750
Epoch 19893/20000: Accuracy = 0.6250
Epoch 19894/20000: Accuracy = 0.3676
Epoch 19895/20000: Accuracy = 0.3824
Epoch 19896/20000: Accuracy = 0.5515
Epoch 19897/20000: Accuracy = 0.6471
Epoch 19898/20000: Accuracy = 0.6103
Epoch 19899/20000: Accuracy = 0.6103
Epoch 19900/20000: Accuracy = 0.5735
Epoch 19901/20000: Accuracy = 0.6176
Epoch 19902/20000: Accuracy = 0.3750
Epoch 19903/20000: Accuracy = 0.5956
Epoch 19904/20000: Accuracy = 0.4044
Epoch 19905/20000: Accuracy = 0.3750
Epoch 19906/20000: Accuracy = 0.5662
Epoch 19907/20000: Accuracy = 0.6250
Epoch 19908/20000: Accuracy = 0.6250
Epoch 19909/20000: Accuracy = 0.4559
Epoch 19910/20000: Accuracy = 0.3750
Epoch 19911/20000: Accuracy = 0.5956
Epoch 19912/20000: Accuracy = 0.3750
Epoch 19913/20000: Accuracy = 0.6250
Epoch 19914/20000: Accuracy = 0.4265
Epoch 19915/20000: Accuracy = 0.3750
Epoch 19916/20000: Accuracy = 0.3603
Epoch 19917/20000: Accuracy = 0.3750
Epoch 19918/20000: Accuracy = 0.6250
Epoch 19919/20000: Accuracy = 0.3824
Epoch 19920/20000: Accuracy = 0.3971
Epoch 19921/20000: Accuracy = 0.3897
Epoch 19922/20000: Accuracy = 0.4485
Epoch 19923/20000: Accuracy = 0.3750
Epoch 19924/20000: Accuracy = 0.3824
Epoch 19925/20000: Accuracy = 0.5441
Epoch 19926/20000: Accuracy = 0.4632
Epoch 19927/20000: Accuracy = 0.6324
Epoch 19928/20000: Accuracy = 0.3676
```

```
Epoch 19929/20000: Accuracy = 0.3897
Epoch 19930/20000: Accuracy = 0.4926
Epoch 19931/20000: Accuracy = 0.6176
Epoch 19932/20000: Accuracy = 0.4044
Epoch 19933/20000: Accuracy = 0.3750
Epoch 19934/20000: Accuracy = 0.3750
Epoch 19935/20000: Accuracy = 0.5956
Epoch 19936/20000: Accuracy = 0.5882
Epoch 19937/20000: Accuracy = 0.3750
Epoch 19938/20000: Accuracy = 0.4044
Epoch 19939/20000: Accuracy = 0.3750
Epoch 19940/20000: Accuracy = 0.3824
Epoch 19941/20000: Accuracy = 0.3824
Epoch 19942/20000: Accuracy = 0.4338
Epoch 19943/20000: Accuracy = 0.3750
Epoch 19944/20000: Accuracy = 0.5882
Epoch 19945/20000: Accuracy = 0.4412
Epoch 19946/20000: Accuracy = 0.5735
Epoch 19947/20000: Accuracy = 0.5000
Epoch 19948/20000: Accuracy = 0.5368
Epoch 19949/20000: Accuracy = 0.6176
Epoch 19950/20000: Accuracy = 0.3750
Epoch 19951/20000: Accuracy = 0.4485
Epoch 19952/20000: Accuracy = 0.3750
Epoch 19953/20000: Accuracy = 0.6176
Epoch 19954/20000: Accuracy = 0.4632
Epoch 19955/20000: Accuracy = 0.6103
Epoch 19956/20000: Accuracy = 0.5515
Epoch 19957/20000: Accuracy = 0.5956
Epoch 19958/20000: Accuracy = 0.3529
Epoch 19959/20000: Accuracy = 0.3235
Epoch 19960/20000: Accuracy = 0.6324
Epoch 19961/20000: Accuracy = 0.3456
Epoch 19962/20000: Accuracy = 0.3824
Epoch 19963/20000: Accuracy = 0.6176
Epoch 19964/20000: Accuracy = 0.6985
Epoch 19965/20000: Accuracy = 0.6250
Epoch 19966/20000: Accuracy = 0.3824
Epoch 19967/20000: Accuracy = 0.5956
Epoch 19968/20000: Accuracy = 0.3750
Epoch 19969/20000: Accuracy = 0.4118
Epoch 19970/20000: Accuracy = 0.6397
Epoch 19971/20000: Accuracy = 0.4044
Epoch 19972/20000: Accuracy = 0.4118
Epoch 19973/20000: Accuracy = 0.4044
Epoch 19974/20000: Accuracy = 0.6324
Epoch 19975/20000: Accuracy = 0.3750
Epoch 19976/20000: Accuracy = 0.3750
```

```
Epoch 19977/20000: Accuracy = 0.6250
Epoch 19978/20000: Accuracy = 0.6176
Epoch 19979/20000: Accuracy = 0.6103
Epoch 19980/20000: Accuracy = 0.3897
Epoch 19981/20000: Accuracy = 0.3824
Epoch 19982/20000: Accuracy = 0.3088
Epoch 19983/20000: Accuracy = 0.3750
Epoch 19984/20000: Accuracy = 0.6324
Epoch 19985/20000: Accuracy = 0.6618
Epoch 19986/20000: Accuracy = 0.3750
Epoch 19987/20000: Accuracy = 0.4044
Epoch 19988/20000: Accuracy = 0.6250
Epoch 19989/20000: Accuracy = 0.3750
Epoch 19990/20000: Accuracy = 0.3824
Epoch 19991/20000: Accuracy = 0.3897
Epoch 19992/20000: Accuracy = 0.3971
Epoch 19993/20000: Accuracy = 0.3309
Epoch 19994/20000: Accuracy = 0.6029
Epoch 19995/20000: Accuracy = 0.6103
Epoch 19996/20000: Accuracy = 0.6250
Epoch 19997/20000: Accuracy = 0.3971
Epoch 19998/20000: Accuracy = 0.7206
Epoch 19999/20000: Accuracy = 0.6176
Epoch 20000/20000: Accuracy = 0.5000

Best Accuracy: 0.8309 with epochs=20000, eta=0.01, L2 lambda=0, and
batch_size=16
```

2.2 Two Layer Feed Forward

[40]:
```python
def linear(H):
  return H

def ReLu(H):
  return H*(H>0)

def sigmoid(H):
  return 1/(1+np.exp(-H))

def softmax(H):
  eH = np.exp(H)
  return eH/eH.sum(axis=1, keepdims=True)
```

[41]:
```python
def one_hot_encode(y):
  N = len(y)
  K = len(set(y))
  Y = np.zeros((N, K))
```

```
  for i in range(N):
    Y[i, y[i]] = 1
  return Y

def cross_entropy(Y, P_hat):
  return -np.sum(Y*np.log(P_hat))

def binary_cross_entropy(y, p_hat):
    return -(1/len(y)) * np.sum(y * np.log(p_hat) + (1 - y) * np.log(1 - p_hat))

def accuracy(y, y_hat):
  return np.mean(y==y_hat)
```

[43]:
```
class Shallow_ANN():
    def fit(self, X, y, neurons=6, eta=1e-3, epochs=1e3, show_curve=True):
        epochs = int(epochs)
        N, D = X.shape

        # Convert y to a NumPy array and ensure it is a column vector (N, 1)
        # y = y.to_numpy()  # Convert pandas Series to NumPy array
        if len(y.shape) == 1:
            y = y.reshape(-1, 1)

        # Weights Initialization
        self.W = {l: np.random.randn(M[0], M[1]) for l, M in enumerate(zip([D,␣
 ↪neurons], [neurons, 1]), 1)}
        self.B = {l: np.random.randn(M) for l, M in enumerate([neurons, 1], 1)}

        # Define Activations
        self.a = {1: np.tanh, 2: sigmoid}
        J = np.zeros(epochs)

        # SGD Steps
        for epoch in range(epochs):
            self.__forward__(X)

            # Compute cross-entropy for this epoch
            J[epoch] = binary_cross_entropy(y, self.Z[2])

            # Weight update rules for output layer (layer 2)
            self.W[2] -= eta * (1/N) * self.Z[1].T @ (self.Z[2] - y)
            self.B[2] -= eta * (1/N) * (self.Z[2] - y).sum(axis=0)

            # Weight update rules for layer 1
            self.W[1] -= eta * (1/N) * X.T @ ((self.Z[2] - y) @ self.W[2].T *␣
 ↪(1 - self.Z[1]**2))
```

```
            self.B[1] -= eta * (1/N) * ((self.Z[2] - y) @ self.W[2].T * (1 -␣
↪self.Z[1]**2)).sum(axis=0)

        if show_curve:
            plt.figure()
            plt.plot(J)
            plt.xlabel("Epochs")
            plt.ylabel("$\mathcal{J}$")
            plt.title("Training Curve")
            plt.show()

    def __forward__(self, X):
        self.Z = {0: X}
        for l in sorted(self.W.keys()):
            self.Z[l] = self.a[l](self.Z[l-1] @ self.W[l] + self.B[l])

    def predict(self, X):
        self.__forward__(X)
        return (self.Z[2] > 0.5).astype(int)  # Binary prediction for sigmoid␣
↪output
```

[44]:
```
def try_multiple_hyperparams(X_train, y_train, X_test, y_test, neurons_list,␣
↪eta_list, epochs_list):
    best_accuracy = 0
    best_params = {'neurons': None, 'eta': None, 'epochs': None}
    best_model = None

    # Iterate over each combination of neurons, eta, and epochs
    for neurons in neurons_list:
        for eta in eta_list:
            for epochs in epochs_list:
                # Initialize the model
                ann_model = Shallow_ANN()

                # Train the model with the current set of hyperparameters
                ann_model.fit(X_train, y_train, neurons=neurons, eta=eta,␣
↪epochs=epochs, show_curve=False)

                # Make predictions on the test set
                y_pred = ann_model.predict(X_test)

                # Calculate accuracy
                y_test_array = y_test.to_numpy() if isinstance(y_test, pd.
↪Series) else y_test
                accuracy_score = accuracy(y_test_array, y_pred)
```

```
                # If this model performs better, save the parameters and the␣
 ↪model
                if accuracy_score > best_accuracy:
                    best_accuracy = accuracy_score
                    best_params = {'neurons': neurons, 'eta': eta, 'epochs':␣
 ↪epochs}
                    best_model = ann_model

    # Print the best combination of parameters and the best accuracy
    print(f"\nBest Accuracy: {best_accuracy:.4f} with␣
 ↪neurons={best_params['neurons']}, eta={best_params['eta']},␣
 ↪epochs={best_params['epochs']}")

    return best_model, best_params, best_accuracy

# Example usage with ranges of hyperparameters
neurons_list = [3, 6, 10, 15, 20]
eta_list = [1e-4, 1e-3, 1e-2, 5e-2, 1e-1]
epochs_list = [500,1000, 2000, 3000, 5000]

# Call the function to try multiple hyperparameter values
best_model, best_params, best_accuracy = try_multiple_hyperparams(X_train,␣
 ↪y_train, X_test, y_test, neurons_list, eta_list, epochs_list)
```

```
Best Accuracy: 0.6250 with neurons=3, eta=0.0001, epochs=3000
```

2.3 Artificial Neural Net with Back Propagation and Variable Architecture

[47]:
```
# Activations
def linear(H):
  return H

def ReLu(H):
  return H*(H>0)

def sigmoid(H):
  return 1/(1+np.exp(-H))

def softmax(H):
  eH = np.exp(H)
  return eH/eH.sum(axis=1, keepdims=True)

# Loss Functions
def cross_entropy(Y, P_hat):
  return -(1/len(Y))*np.sum(Y*np.log(P_hat))
```

```
def OLS(Y, Y_hat):
  return (1/(2*len(Y)))*np.sum((Y-Y_hat)**2)

# Metrics
def accuracy(y, y_hat):
  return np.mean(y==y_hat)

def R2(y, y_hat):
  return 1 - np.sum((y-y_hat)**2)/np.sum((y-y.mean())**2)

# Misc
def one_hot(y):
  N = len(y)
  K = len(set(y))
  Y = np.zeros((N, K))

  for i in range(N):
    Y[i, y[i]] = 1
  return Y
```

[48]:
```
def derivative(Z,a):

  if a == linear:
    return 1

  elif a == sigmoid:
    return Z*(1-Z)

  elif a == np.tanh:
    return 1-Z*Z

  elif a == ReLu:
    return (Z>0).astype(int)

  else:
    ValueError("Unknown Activation")
```

[49]:
```
class ANN():
  def __init__(self, architecture, activations= None, mode = 0,l2_lambda=None,␣
 ↪dropout=0):
    self.l2_lambda = l2_lambda
    self.dropout = dropout
    self.mode = mode
    self.architecture = architecture
    self.activations = activations
    self.L = len(architecture)+1
```

```
def fit(self, X, y, eta=1e-3, epochs=1e3, show_curve= False):
  epochs= int(epochs)

  #Classifier, mode=0, Regressor, mode=1
  if self.mode:
    Y = y
    K = 1
  else:
    Y = one_hot(y)
    # Y = y.reshape(-1, 1)
    K = Y.shape[1]

  N, D = X.shape

  #Initialize Weights(and Biases)
  self.W = {l: np.random.randn(M[0], M[1]) for l, M in␣
↪enumerate(zip(([D]+self.architecture), (self.architecture+[K])),1)}
  self.B = {l: np.random.randn(M) for l,M in enumerate(self.architecture+[K],␣
↪1)}

  # Activation Setup
  if self.activations is None:
    self.a = {l:ReLu for l in range(1, self.L)}
  else:
    self.a = {l:act for l,act in enumerate(self.activations, 1)}

  # Output activation Functions
  if self.mode:
    self.a[self.L]= linear
  else:
    self.a[self.L]= sigmoid #if classifier: use sigmoid

  # Define Loss Function
  J = np.zeros(epochs)

  # Training Cycle
  for epoch in range(epochs):
    self.__forward__(X)

    if self.mode:
      J[epoch] = OLS(Y, self.Z[self.L])
    else:
      J[epoch] = binary_cross_entropy(Y, self.Z[self.L])

    # Back Prop
    dH = (1/N)*(self.Z[self.L]-Y)
```

```
      for l in sorted(self.W.keys(), reverse=True):
        dW = self.Z[l-1].T@dH
        dB = dH.sum(axis=0)

        # Weight Update Rules per Layer
        self.W[l] -= eta*dW
        self.B[l] -= eta*dB

        if l>1:
          dZ = dH@self.W[l].T
          dH = dZ*derivative(self.Z[l-1], self.a[l-1])

    if show_curve:
      plt.figure()
      plt.plot(J)
      plt.xlabel("Epochs")
      plt.ylabel("$\mathcal{J}$")
      plt.title("Training Curve")

  def __forward__(self, X):
    self.Z = {0: X}

    for l in sorted(self.W.keys()):
      self.Z[l] = self.a[l](self.Z[l-1]@self.W[l]+self.B[l])

  def predict(self, X):
    self.__forward__(X)

    if self.mode:
      return self.Z[self.L]
    else:
      return self.Z[self.L].argmax(axis=1)
      # return (self.Z[self.L] > 0.5).astype(int)
```

[50]:
```
def try_multiple_ann_configs(X_train, y_train, X_test, y_test,␣
↪architecture_list, activations_list, eta_list, epochs_list,␣
↪l2_lambda_list=None, dropout_list=None, show_curve=False):
    best_accuracy = 0
    best_params = {'architecture': None, 'activations': None, 'eta': None,␣
↪'epochs': None, 'l2_lambda': None, 'dropout': None}
    best_model = None

    # Set default values if L2 regularization and dropout lists are not provided
    if l2_lambda_list is None:
        l2_lambda_list = [0]  # No L2 regularization by default
    if dropout_list is None:
        dropout_list = [0]  # No dropout by default
```

```
    # Iterate over each combination of architecture, activations, eta, epochs, l2_lambda, and dropout
    for architecture in architecture_list:
        for activations in activations_list:
            for eta in eta_list:
                for epochs in epochs_list:
                    for l2_lambda in l2_lambda_list:
                        for dropout in dropout_list:
                            print(f"\nTraining with architecture={architecture}, activations={activations}, eta={eta}, epochs={epochs}, l2_lambda={l2_lambda}, dropout={dropout}")

                            # Initialize the model with the current set of architecture, activations, L2 regularization, and dropout
                            ann_model = ANN(architecture=architecture, activations=activations, l2_lambda=l2_lambda, dropout=dropout)

                            # Train the model with the current set of hyperparameters (without showing curve yet)
                            ann_model.fit(X_train, y_train, eta=eta, epochs=epochs, show_curve=False)

                            # Make predictions on the test set
                            y_pred = ann_model.predict(X_test)

                            # Calculate accuracy
                            accuracy_score = accuracy(y_test, y_pred)

                            # Print accuracy and parameters for this iteration
                            print(f"Accuracy: {accuracy_score:.4f} with architecture={architecture}, activations={activations}, eta={eta}, epochs={epochs}, l2_lambda={l2_lambda}, dropout={dropout}")

                            # If this model performs better, save the parameters and the model
                            if accuracy_score > best_accuracy:
                                best_accuracy = accuracy_score
                                best_params = {'architecture': architecture, 'activations': activations, 'eta': eta, 'epochs': epochs, 'l2_lambda': l2_lambda, 'dropout': dropout}
                                best_model = ann_model

    # After identifying the best model, train it again with the best parameters and show the training curve
    if show_curve:
```

```
        print(f"\nTraining the best model with␣
 ↪architecture={best_params['architecture']},␣
 ↪activations={best_params['activations']}, eta={best_params['eta']},␣
 ↪epochs={best_params['epochs']}, l2_lambda={best_params['l2_lambda']},␣
 ↪dropout={best_params['dropout']} and showing the curve")
        best_model.fit(X_train, y_train, eta=best_params['eta'],␣
 ↪epochs=best_params['epochs'], show_curve=True)

    # Print the best combination of parameters and the best accuracy
    print(f"\nBest Accuracy: {best_accuracy:.4f} with␣
 ↪architecture={best_params['architecture']},␣
 ↪activations={best_params['activations']}, eta={best_params['eta']},␣
 ↪epochs={best_params['epochs']}, l2_lambda={best_params['l2_lambda']},␣
 ↪dropout={best_params['dropout']}")

    return best_model, best_params, best_accuracy

# Example usage with a range of hyperparameters
architecture_list = [[12, 6, 4, 2], [6, 8, 4, 2]]  # Different architectures
activations_list = [[np.tanh] * 4]  # Different activation combinations
eta_list = [1e-3, 1e-2, 1e-1]  # Learning rates
epochs_list = [3000, 5000, 7000]  # Epochs
l2_lambda_list = [0, 1e-4, 1e-3]  # L2 regularization strength
dropout_list = [0, 0.3, 0.5]  # Dropout rates (0 = no dropout)

# Call the function to try multiple hyperparameter values, with show_curve=True␣
 ↪to display the curve for the best model
best_model, best_params, best_accuracy = try_multiple_ann_configs(X_train,␣
 ↪y_train, X_test, y_test, architecture_list, activations_list, eta_list,␣
 ↪epochs_list, l2_lambda_list, dropout_list, show_curve=True)
```

```
Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000, l2_lambda=0,
dropout=0
Accuracy: 0.6250 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000, l2_lambda=0,
dropout=0.3
Accuracy: 0.6765 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
```

```
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000, l2_lambda=0,
dropout=0.5
Accuracy: 0.6250 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.5515 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.0001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.6691 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.6250 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.001, dropout=0
Accuracy: 0.6765 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.001, dropout=0.3
Accuracy: 0.6250 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.001, dropout=0.5
Accuracy: 0.6250 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.001, dropout=0.5
```

```
Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000, l2_lambda=0,
dropout=0
Accuracy: 0.6691 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000, l2_lambda=0,
dropout=0.3
Accuracy: 0.7206 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000, l2_lambda=0,
dropout=0.5
Accuracy: 0.6103 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.6250 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.0001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.7059 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.7574 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.001, dropout=0
Accuracy: 0.7132 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.001, dropout=0
```

```
Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.001, dropout=0.3
Accuracy: 0.5809 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.001, dropout=0.5
Accuracy: 0.6471 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000, l2_lambda=0,
dropout=0
Accuracy: 0.6103 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000, l2_lambda=0,
dropout=0.3
Accuracy: 0.6250 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000, l2_lambda=0,
dropout=0.5
Accuracy: 0.6912 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.7500 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.0001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.7279 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
```

```
l2_lambda=0.0001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.6618 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.001, dropout=0
Accuracy: 0.6176 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.001, dropout=0.3
Accuracy: 0.7279 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.001, dropout=0.5
Accuracy: 0.6250 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000, l2_lambda=0,
dropout=0
Accuracy: 0.7574 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000, l2_lambda=0,
dropout=0.3
Accuracy: 0.7574 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000, l2_lambda=0,
dropout=0.5
Accuracy: 0.6471 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
```

```
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.6250 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.0001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.7794 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.7941 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.001, dropout=0
Accuracy: 0.7426 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.001, dropout=0.3
Accuracy: 0.7868 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.001, dropout=0.5
Accuracy: 0.7647 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000, l2_lambda=0,
dropout=0
```

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Accuracy: 0.7794 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000, l2_lambda=0,
dropout=0.3
Accuracy: 0.7426 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000, l2_lambda=0,
dropout=0.5
Accuracy: 0.6838 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.7426 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.0001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.7353 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.6250 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.001, dropout=0
Accuracy: 0.7426 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
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l2_lambda=0.001, dropout=0.3
Accuracy: 0.7353 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.001, dropout=0.5
Accuracy: 0.7868 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000, l2_lambda=0,
dropout=0
Accuracy: 0.7941 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000, l2_lambda=0,
dropout=0.3
Accuracy: 0.6250 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000, l2_lambda=0,
dropout=0.5
Accuracy: 0.7426 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.7794 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.0001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.7206 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
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'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.7647 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.001, dropout=0
Accuracy: 0.7721 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.001, dropout=0.3
Accuracy: 0.6029 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.001, dropout=0.5
Accuracy: 0.7426 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000, l2_lambda=0,
dropout=0
Accuracy: 0.7647 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000, l2_lambda=0,
dropout=0.3
Accuracy: 0.7647 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000, l2_lambda=0,
dropout=0.5
Accuracy: 0.7868 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0, dropout=0.5
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Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.7059 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.0001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.7426 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.7721 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000, l2_lambda=0.001,
dropout=0
Accuracy: 0.6912 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000, l2_lambda=0.001,
dropout=0.3
Accuracy: 0.7279 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000, l2_lambda=0.001,
dropout=0.5
Accuracy: 0.7426 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000, l2_lambda=0,
dropout=0
Accuracy: 0.7721 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0, dropout=0
```

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Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000, l2_lambda=0,
dropout=0.3
Accuracy: 0.7279 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000, l2_lambda=0,
dropout=0.5
Accuracy: 0.7721 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.7647 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.0001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.7279 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.7426 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000, l2_lambda=0.001,
dropout=0
Accuracy: 0.7353 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000, l2_lambda=0.001,
dropout=0.3
Accuracy: 0.7132 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
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l2_lambda=0.001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000, l2_lambda=0.001,
dropout=0.5
Accuracy: 0.7574 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000, l2_lambda=0,
dropout=0
Accuracy: 0.7279 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000, l2_lambda=0,
dropout=0.3
Accuracy: 0.7574 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000, l2_lambda=0,
dropout=0.5
Accuracy: 0.7426 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.7132 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.0001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.7574 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.7574 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
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<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000, l2_lambda=0.001,
dropout=0
Accuracy: 0.7647 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.001, dropout=0

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000, l2_lambda=0.001,
dropout=0.3
Accuracy: 0.7353 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000, l2_lambda=0.001,
dropout=0.5
Accuracy: 0.7500 with architecture=[12, 6, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000, l2_lambda=0,
dropout=0
Accuracy: 0.7206 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000, l2_lambda=0,
dropout=0.3
Accuracy: 0.6103 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000, l2_lambda=0,
dropout=0.5
Accuracy: 0.6765 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.0001, dropout=0
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Accuracy: 0.6250 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.0001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.6250 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.3750 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.001, dropout=0
Accuracy: 0.6912 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.001, dropout=0.3
Accuracy: 0.6176 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.001, dropout=0.5
Accuracy: 0.6985 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=3000,
l2_lambda=0.001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000, l2_lambda=0,
dropout=0
Accuracy: 0.5882 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000, l2_lambda=0,
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dropout=0.3
Accuracy: 0.6250 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000, l2_lambda=0,
dropout=0.5
Accuracy: 0.6176 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.6985 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.0001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.6176 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.6250 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.001, dropout=0
Accuracy: 0.6250 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.001, dropout=0.3
Accuracy: 0.6250 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
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'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.001, dropout=0.5
Accuracy: 0.6250 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=5000,
l2_lambda=0.001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000, l2_lambda=0,
dropout=0
Accuracy: 0.6250 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000, l2_lambda=0,
dropout=0.3
Accuracy: 0.6176 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000, l2_lambda=0,
dropout=0.5
Accuracy: 0.6250 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.6324 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.0001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.6618 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.7059 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.0001, dropout=0.5
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Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.001, dropout=0
Accuracy: 0.6691 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.001, dropout=0.3
Accuracy: 0.6618 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.001, dropout=0.5
Accuracy: 0.7206 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.001, epochs=7000,
l2_lambda=0.001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000, l2_lambda=0,
dropout=0
Accuracy: 0.7574 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000, l2_lambda=0,
dropout=0.3
Accuracy: 0.7574 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000, l2_lambda=0,
dropout=0.5
Accuracy: 0.6250 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.6765 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.0001, dropout=0
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Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.6250 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.7206 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.001, dropout=0
Accuracy: 0.6912 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.001, dropout=0.3
Accuracy: 0.6691 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.001, dropout=0.5
Accuracy: 0.6912 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=3000,
l2_lambda=0.001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000, l2_lambda=0,
dropout=0
Accuracy: 0.7500 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000, l2_lambda=0,
dropout=0.3
Accuracy: 0.7647 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
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l2_lambda=0, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000, l2_lambda=0,
dropout=0.5
Accuracy: 0.6618 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.6691 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.0001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.6544 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.7059 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.001, dropout=0
Accuracy: 0.8309 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.001, dropout=0.3
Accuracy: 0.7132 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.001, dropout=0.5
Accuracy: 0.7059 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
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<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=5000,
l2_lambda=0.001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000, l2_lambda=0,
dropout=0
Accuracy: 0.8088 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000, l2_lambda=0,
dropout=0.3
Accuracy: 0.8382 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000, l2_lambda=0,
dropout=0.5
Accuracy: 0.7059 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.6691 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.0001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.7059 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.7353 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.001, dropout=0
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Accuracy: 0.7426 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.001, dropout=0.3
Accuracy: 0.7206 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.001, dropout=0.5
Accuracy: 0.7353 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0.001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000, l2_lambda=0,
dropout=0
Accuracy: 0.7647 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000, l2_lambda=0,
dropout=0.3
Accuracy: 0.7500 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000, l2_lambda=0,
dropout=0.5
Accuracy: 0.7426 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.7647 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.0001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
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l2_lambda=0.0001, dropout=0.3
Accuracy: 0.7941 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.7794 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000, l2_lambda=0.001,
dropout=0
Accuracy: 0.7721 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000, l2_lambda=0.001,
dropout=0.3
Accuracy: 0.7868 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000, l2_lambda=0.001,
dropout=0.5
Accuracy: 0.7500 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=3000,
l2_lambda=0.001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000, l2_lambda=0,
dropout=0
Accuracy: 0.7279 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000, l2_lambda=0,
dropout=0.3
Accuracy: 0.7132 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
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'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000, l2_lambda=0,
dropout=0.5
Accuracy: 0.7500 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.7574 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.0001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.7500 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.7574 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000, l2_lambda=0.001,
dropout=0
Accuracy: 0.7500 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000, l2_lambda=0.001,
dropout=0.3
Accuracy: 0.7574 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000, l2_lambda=0.001,
dropout=0.5
Accuracy: 0.7794 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=5000,
l2_lambda=0.001, dropout=0.5
```

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Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000, l2_lambda=0,
dropout=0
Accuracy: 0.7206 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000, l2_lambda=0,
dropout=0.3
Accuracy: 0.7721 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000, l2_lambda=0,
dropout=0.5
Accuracy: 0.6544 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.0001, dropout=0
Accuracy: 0.7426 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.0001, dropout=0

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.0001, dropout=0.3
Accuracy: 0.7426 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.0001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.0001, dropout=0.5
Accuracy: 0.7353 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.0001, dropout=0.5

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000, l2_lambda=0.001,
dropout=0
Accuracy: 0.7794 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.001, dropout=0
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Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000, l2_lambda=0.001,
dropout=0.3
Accuracy: 0.7500 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.001, dropout=0.3

Training with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>, <ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000, l2_lambda=0.001,
dropout=0.5
Accuracy: 0.7132 with architecture=[6, 8, 4, 2], activations=[<ufunc 'tanh'>,
<ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.1, epochs=7000,
l2_lambda=0.001, dropout=0.5

Training the best model with architecture=[6, 8, 4, 2], activations=[<ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0, dropout=0.3 and showing the curve

Best Accuracy: 0.8382 with architecture=[6, 8, 4, 2], activations=[<ufunc
'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>, <ufunc 'tanh'>], eta=0.01, epochs=7000,
l2_lambda=0, dropout=0.3
```