Introduction

This is a classification problem in which we need to classify whether the loan will be approved or not. classification refers to a predictive modeling problem where a class label is predicted for a given example of input data.

Overview

loan is a sum of money that is borrowed and repaid over a period of time, typically with interest. There are various types of loans available to individuals and businesses, such as personal loans, mortgages, auto loans, student loans, business loans and many more. They are offered by banks, credit unions, and other financial institutions, and the terms of the loan, such as interest rate, repayment period, and fees, vary depending on the lender and the type of loan.

A personal loan is a type of unsecured loan that can be used for a variety of expenses such as home repairs, medical expenses, debt consolidation, and more. The loan amount, interest rate, and repayment period vary depending on the lender and the borrower's creditworthiness. To qualify for a personal loan, borrowers typically need to provide proof of income and have a good credit score.

Predicting personal loan approval using machine learning analyses a borrower's financial data and credit history to determine the likelihood of loan approval. This can help financial institutions to make more informed decisions about which loan applications to approve and which to deny.

Purpose:

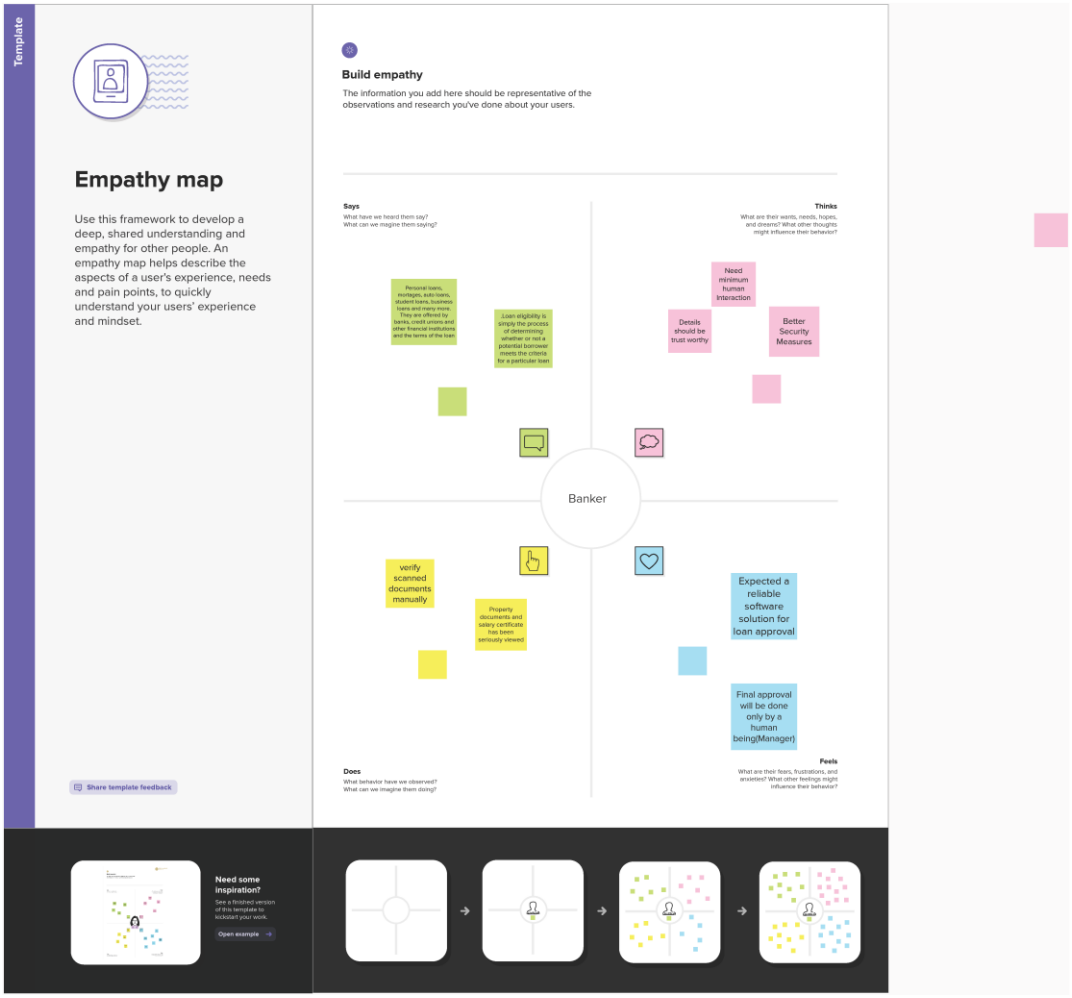
Loan eligibility is simply the process of determining whether or not a potential borrower meets the criteria for a particular loan. This can be based on factors such as credit score, employment history, and income level. Loan eligibility is important because it helps to ensure that borrowers are able to repay their loans. Default can lead to a variety of negative consequences, including damage to one's credit score and difficulty obtaining future financing. As such, lenders take great care to assess loan eligibility before extending credit. By understanding the factors that lenders use to determine loan eligibility, borrowers can improve their chances of being approved for financing.

This report will show the borrower's current level of debt, as well as their payment history. Lenders will also look at public records in order to get an idea of the borrower's financial history. In some cases, lenders may also require documentation such as tax returns or pay stubs in order to verify the borrower's income.

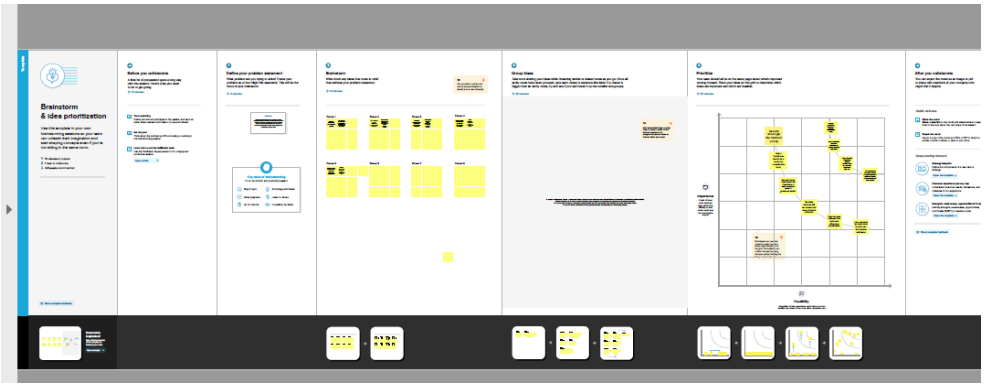
Problem Definition & Design Thinking

Empathy Map

Error! Not a valid embedded object.



Ideation & BrainStroming Map



RESULT

Advantages & Disadvantages

Every coin has two faces, each face has its own property and features. It's time to uncover the faces of ML. A very powerful tool that holds the potential to revolutionize the way things work.

Advantages of Machine Learning

1. Easily identifies trends and patterns

Machine Learning can review large volumes of data and discover specific trends and patterns that would not be apparent to humans. For instance, for an e-commerce website like Amazon, it serves to understand the browsing behaviors and purchase histories of its users to help cater to the right products, deals, and reminders relevant to them. It uses the results to reveal relevant advertisements to them.

2. No human intervention needed (automation)

With ML, you don't need to babysit your project every step of the way. Since it means giving machines the ability to learn, it lets them make predictions and also improve the algorithms on their own. A common example of this is anti-virus softwares; they learn to filter new threats as they are recognized. ML is also good at recognizing spam.

3. Continuous Improvement

As **ML algorithms** gain experience, they keep improving in accuracy and efficiency. This lets them make better decisions. Say you need to make a weather forecast model. As the amount of data you have keeps growing, your algorithms learn to make more accurate predictions faster.

4. Handling multi-dimensional and multi-variety data

Machine Learning algorithms are good at handling data that are multi-dimensional and multi-variety, and they can do this in dynamic or uncertain environments.

5. Wide Applications

You could be an e-tailer or a healthcare provider and make ML work for you. Where it does apply, it holds the capability to help deliver a much more personal experience to customers while also targeting the right customers.

Disadvantages of Machine Learning

With all those advantages to its powerfulness and popularity, Machine Learning isn't perfect. The following factors serve to limit it:

1. Data Acquisition

Machine Learning requires massive data sets to train on, and these should be inclusive/unbiased, and of good quality. There can also be times where they must wait for new data to be generated.

2. Time and Resources

ML needs enough time to let the algorithms learn and develop enough to fulfill their purpose with a considerable amount of accuracy and relevancy also needs massive resources to function. This can mean additional requirements of computer power for you.

3. Interpretation of Results

Another major challenge is the ability to accurately interpret results generated by the algorithms. You must also carefully choose the algorithms for your purpose.

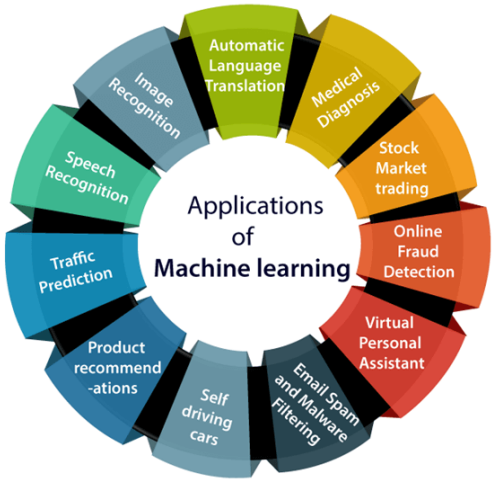
4. High error-susceptibility

Machine Learning is autonomous but highly susceptible to errors. Suppose you train an algorithm with data sets small enough to not be inclusive. You end up with biased predictions coming from a biased training

set. This leads to irrelevant advertisements being displayed to customers. In the case of ML, such blunders can set off a chain of errors that can go undetected for long periods of time. And when they do get noticed, it takes quite some time to recognize the source of the issue, and even longer to correct it.

Applications

Machine learning is a buzzword for today's technology, and it is growing very rapidly day by day. We are using machine learning in our daily life even without knowing it such as Google Maps, Google assistant, Alexa, etc. Below are some most trending real-world applications of Machine Learning.



1. Image Recognition:

Image recognition is one of the most common applications of machine learning. It is used to identify objects, persons, places, digital images, etc. The popular use case of image recognition and face detection is, **Automatic friend tagging suggestion**:

Facebook provides us a feature of auto friend tagging suggestion. Whenever we upload a photo with our Facebook friends, then we automatically get a tagging suggestion with name, and the technology behind this is machine learning's **face detection** and **recognition algorithm**.

It is based on the Facebook project named "**Deep Face**," which is responsible for face recognition and person identification in the picture.

2. Speech Recognition

While using Google, we get an option of "**Search by voice**," it comes under speech recognition, and it's a popular application of machine learning.

Speech recognition is a process of converting voice instructions into text, and it is also known as "**Speech to text**", or "**Computer speech recognition**." At present, machine learning algorithms are widely used by various applications of speech recognition. **Google assistant**, **Siri**, **Cortana**, and **Alexa** are using speech recognition technology to follow the voice instructions.

3. Traffic prediction:

If we want to visit a new place, we take help of Google Maps, which shows us the correct path with the shortest route and predicts the traffic conditions.

It predicts the traffic conditions such as whether traffic is cleared, slow-moving, or heavily congested with the help of two ways:

- **Real Time location** of the vehicle form Google Map app and sensors
- **Average time has taken** on past days at the same time.

Everyone who is using Google Map is helping this app to make it better. It takes information from the user and sends back to its database to improve the performance.

4. Product recommendations:

Machine learning is widely used by various e-commerce and entertainment companies such as **Amazon**, **Netflix**, etc., for product recommendation to the user. Whenever we search for some product on Amazon, then we started getting an advertisement for the same product while internet surfing on the same browser and this is because of machine learning.

Google understands the user interest using various machine learning algorithms and suggests the product as per customer interest.

As similar, when we use Netflix, we find some recommendations for entertainment series, movies, etc., and this is also done with the help of machine learning.

5. Self-driving cars:

One of the most exciting applications of machine learning is self-driving cars. Machine learning plays a significant role in self-driving cars. Tesla, the most popular car manufacturing company is working on self-driving car. It is using unsupervised learning method to train the car models to detect people and objects while driving.

6. Email Spam and Malware Filtering:

Whenever we receive a new email, it is filtered automatically as important, normal, and spam. We always receive an important mail in our inbox with the important symbol and spam emails in our spam box, and the technology behind this is Machine learning. Below are some spam filters used by Gmail:

- Content Filter
- Header filter
- General blacklists filter
- Rules-based filters
- Permission filters

Some machine learning algorithms such as **Multi-Layer Perceptron**, **Decision tree**, and **Naïve Bayes classifier** are used for email spam filtering and malware detection.

7. Virtual Personal Assistant:

We have various virtual personal assistants such as **Google assistant**, **Alexa**, **Cortana**, **Siri**. As the name suggests, they help us in finding the information using our voice instruction. These assistants can help us in various ways just by our voice instructions such as Play music, call someone, Open an email, Scheduling an appointment, etc.

These virtual assistants use machine learning algorithms as an important part.

These assistant record our voice instructions, send it over the server on a cloud, and decode it using ML algorithms and act accordingly.

8. Online Fraud Detection:

Machine learning is making our online transaction safe and secure by detecting fraud transaction. Whenever we perform some online transaction, there may be various ways that a fraudulent transaction can take place such as **fake accounts**, **fake ids**, and **steal money** in the middle of a transaction. So to detect this, **Feed Forward Neural network** helps us by checking whether it is a genuine transaction or a fraud transaction.

For each genuine transaction, the output is converted into some hash values, and these values become the input for the next round. For each genuine transaction, there is a specific pattern which gets change for the fraud transaction hence, it detects it and makes our online transactions more secure.

9. Stock Market trading:

Machine learning is widely used in stock market trading. In the stock market, there is always a risk of up and downs in shares, so for this machine learning's **long short term memory neural network** is used for the prediction of stock market trends.

10. Medical Diagnosis:

In medical science, machine learning is used for diseases diagnoses. With this, medical technology is growing very fast and able to build 3D models that can predict the exact position of lesions in the brain. It helps in finding brain tumors and other brain-related diseases easily.

11. Automatic Language Translation:

Nowadays, if we visit a new place and we are not aware of the language then it is not a problem at all, as for this also machine learning helps us by converting the text into our known languages. Google's GNMT (Google Neural Machine Translation) provide this feature, which is a Neural Machine Learning that translates the text into our familiar language, and it called as automatic translation.

The technology behind the automatic translation is a sequence to sequence learning algorithm, which is used with image recognition and translates the text from one language to another language.

Conclusion

Machine learning is a field of artificial intelligence that deals with the design and development of algorithms that can learn from and make predictions on data. The aim of machine learning is to automate analytical model building and enable computers to learn from data without being explicitly programmed to do so.

Machine learning is a powerful tool for making predictions from data. However, it is important to remember that machine learning is only as good as the data that is used to train the algorithms. In order to make accurate predictions, it is important to use high-quality data that is representative of the real-world data that the algorithm will be used on.

Future Scope

The scope of Machine Learning is not limited to the investment sector. Rather, it is expanding across all fields such as banking and finance, information technology, media & entertainment, gaming, and the automotive industry.

As the Machine Learning scope is very high, there are some areas where researchers are working toward revolutionizing the world for the future.

```
import pandas as pd
import numpy as np
import pickle
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
import sklearn
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import
GradientBoostingClassifier,RandomForestClassifier
from sklearn.neighbors import KNeighborsClassifier
from sklearn.model_selection import RandomizedSearchCV
import imblearn
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.metrics import accuracy_score, classification_report,
confusion_matrix, f1_score



data=pd.read_csv("C:\\ml ds\\train_u6lujuX_CVtuZ9i.csv")
data
```

```
      Loan_ID  Gender Married Dependents     Education
Self_Employed  \
0    LP001002    Male      No          0      Graduate            No

1    LP001003    Male     Yes          1      Graduate            No

2    LP001005    Male     Yes          0      Graduate           Yes

3    LP001006    Male     Yes          0  Not Graduate            No

4    LP001008    Male      No          0      Graduate            No

..        ...     ...     ...        ...           ...           ...

609  LP002978  Female      No          0      Graduate            No

610  LP002979    Male     Yes         3+      Graduate            No

611  LP002983    Male     Yes          1      Graduate            No

612  LP002984    Male     Yes          2      Graduate            No

613  LP002990  Female      No          0      Graduate           Yes


     ApplicantIncome  CoapplicantIncome  LoanAmount  Loan_Amount_Term
```

```
\
0               5849                0.0         NaN             360.0

1               4583             1508.0       128.0             360.0

2               3000                0.0        66.0             360.0

3               2583             2358.0       120.0             360.0

4               6000                0.0       141.0             360.0

..               ...                ...         ...               ...

609             2900                0.0        71.0             360.0

610             4106                0.0        40.0             180.0

611             8072              240.0       253.0             360.0

612             7583                0.0       187.0             360.0

613             4583                0.0       133.0             360.0


     Credit_History Property_Area Loan_Status
0               1.0         Urban           Y
1               1.0         Rural           N
2               1.0         Urban           Y
3               1.0         Urban           Y
4               1.0         Urban           Y
..              ...           ...         ...
609             1.0         Rural           Y
610             1.0         Rural           Y
611             1.0         Urban           Y
612             1.0         Urban           Y
613             0.0     Semiurban           N

[614 rows x 13 columns]

data.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 614 entries, 0 to 613
Data columns (total 13 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   Loan_ID            614 non-null    object
 1   Gender             601 non-null    object
 2   Married            611 non-null    object
```

```
 3   Dependents         599 non-null    object
 4   Education          614 non-null    object
 5   Self_Employed      582 non-null    object
 6   ApplicantIncome    614 non-null    int64
 7   CoapplicantIncome  614 non-null    float64
 8   LoanAmount         592 non-null    float64
 9   Loan_Amount_Term   600 non-null    float64
 10  Credit_History     564 non-null    float64
 11  Property_Area      614 non-null    object
 12  Loan_Status        614 non-null    object
dtypes: float64(4), int64(1), object(8)
memory usage: 62.5+ KB
```

```
data.drop(['Loan_ID'],axis=1, inplace=True)
```

```
data.head()
```

```
  Gender Married Dependents     Education Self_Employed
ApplicantIncome  \
0   Male      No          0      Graduate            No
5849
1   Male     Yes          1      Graduate            No
4583
2   Male     Yes          0      Graduate           Yes
3000
3   Male     Yes          0  Not Graduate            No
2583
4   Male      No          0      Graduate            No
6000

   CoapplicantIncome  LoanAmount  Loan_Amount_Term  Credit_History  \
0                0.0         NaN             360.0             1.0
1             1508.0       128.0             360.0             1.0
2                0.0        66.0             360.0             1.0
3             2358.0       120.0             360.0             1.0
4                0.0       141.0             360.0             1.0

  Property_Area Loan_Status
0         Urban           Y
1         Rural           N
2         Urban           Y
3         Urban           Y
4         Urban           Y
```

Data Preprocessing

HAndling Categorical Values

```
data['Gender']=data['Gender'].map({'Female':1, 'Male':0})
data.head()
```

```
   Gender Married Dependents     Education Self_Employed
ApplicantIncome  \
0     0.0      No          0      Graduate            No
5849
1     0.0     Yes          1      Graduate            No
4583
2     0.0     Yes          0      Graduate           Yes
3000
3     0.0     Yes          0  Not Graduate            No
2583
4     0.0      No          0      Graduate            No
6000

   CoapplicantIncome  LoanAmount  Loan_Amount_Term  Credit_History  \
0                0.0         NaN             360.0             1.0
1             1508.0       128.0             360.0             1.0
2                0.0        66.0             360.0             1.0
3             2358.0       120.0             360.0             1.0
4                0.0       141.0             360.0             1.0

  Property_Area Loan_Status
0         Urban           Y
1         Rural           N
2         Urban           Y
3         Urban           Y
4         Urban           Y
```

```
data['Property_Area']=data['Property_Area'].map({'Urban':2,
'Semiurban':1, 'Rural':0})
data.head()
```

```
   Gender Married Dependents     Education Self_Employed
ApplicantIncome  \
0     0.0      No          0      Graduate            No
5849
1     0.0     Yes          1      Graduate            No
4583
2     0.0     Yes          0      Graduate           Yes
3000
3     0.0     Yes          0  Not Graduate            No
2583
4     0.0      No          0      Graduate            No
6000

   CoapplicantIncome  LoanAmount  Loan_Amount_Term  Credit_History  \
0                0.0         NaN             360.0             1.0
1             1508.0       128.0             360.0             1.0
2                0.0        66.0             360.0             1.0
3             2358.0       120.0             360.0             1.0
4                0.0       141.0             360.0             1.0
```

```
   Property_Area Loan_Status
0              2           Y
1              0           N
2              2           Y
3              2           Y
4              2           Y
```

```
data['Married']=data['Married'].map({'Yes':1, 'N0':0})
data.head()
```

```
   Gender  Married Dependents     Education Self_Employed
ApplicantIncome  \
0     0.0      NaN          0      Graduate            No
5849
1     0.0      1.0          1      Graduate            No
4583
2     0.0      1.0          0      Graduate           Yes
3000
3     0.0      1.0          0  Not Graduate            No
2583
4     0.0      NaN          0      Graduate            No
6000

   CoapplicantIncome  LoanAmount  Loan_Amount_Term  Credit_History  \
0                0.0         NaN             360.0             1.0
1             1508.0       128.0             360.0             1.0
2                0.0        66.0             360.0             1.0
3             2358.0       120.0             360.0             1.0
4                0.0       141.0             360.0             1.0

   Property_Area Loan_Status
0              2           Y
1              0           N
2              2           Y
3              2           Y
4              2           Y
```

```
data['Education']=data['Education'].map({'Graduate':1, 'N0t
Graduate':0})
data.head()
```

```
   Gender  Married Dependents  Education Self_Employed
ApplicantIncome  \
0     0.0      NaN          0        1.0            No
5849
1     0.0      1.0          1        1.0            No
4583
2     0.0      1.0          0        1.0           Yes
3000
3     0.0      1.0          0        NaN            No
```

```
2583
4     0.0      NaN          0        1.0            No
6000

   CoapplicantIncome  LoanAmount  Loan_Amount_Term  Credit_History  \
0                0.0         NaN             360.0             1.0
1             1508.0       128.0             360.0             1.0
2                0.0        66.0             360.0             1.0
3             2358.0       120.0             360.0             1.0
4                0.0       141.0             360.0             1.0

   Property_Area Loan_Status
0              2           Y
1              0           N
2              2           Y
3              2           Y
4              2           Y


data['Self_Employed']=data['Self_Employed'].map({'Yes':1, 'N0':0})
data.head()

   Gender  Married Dependents  Education  Self_Employed
ApplicantIncome  \
0     0.0      NaN          0        1.0            NaN
5849
1     0.0      1.0          1        1.0            NaN
4583
2     0.0      1.0          0        1.0            1.0
3000
3     0.0      1.0          0        NaN            NaN
2583
4     0.0      NaN          0        1.0            NaN
6000

   CoapplicantIncome  LoanAmount  Loan_Amount_Term  Credit_History  \
0                0.0         NaN             360.0             1.0
1             1508.0       128.0             360.0             1.0
2                0.0        66.0             360.0             1.0
3             2358.0       120.0             360.0             1.0
4                0.0       141.0             360.0             1.0

   Property_Area Loan_Status
0              2           Y
1              0           N
2              2           Y
3              2           Y
4              2           Y
```

```
data['Loan_Status']=data['Loan_Status'].map({'Y':1, 'N':0})
data.head()
```

```
   Gender  Married Dependents  Education  Self_Employed
ApplicantIncome  \
0     0.0      NaN          0        1.0            NaN
5849
1     0.0      1.0          1        1.0            NaN
4583
2     0.0      1.0          0        1.0            1.0
3000
3     0.0      1.0          0        NaN            NaN
2583
4     0.0      NaN          0        1.0            NaN
6000

   CoapplicantIncome  LoanAmount  Loan_Amount_Term  Credit_History  \
0                0.0         NaN             360.0             1.0
1             1508.0       128.0             360.0             1.0
2                0.0        66.0             360.0             1.0
3             2358.0       120.0             360.0             1.0
4                0.0       141.0             360.0             1.0

   Property_Area  Loan_Status
0              2            1
1              0            0
2              2            1
3              2            1
4              2            1
```

Handling missing values

```
data.isnull().sum()
```

```
Gender               13
Married             216
Dependents           15
Education           134
Self_Employed       532
ApplicantIncome       0
CoapplicantIncome     0
LoanAmount           22
Loan_Amount_Term     14
Credit_History       50
Property_Area         0
Loan_Status           0
dtype: int64
```

```
data['Gender'] = data['Gender'].fillna(data['Gender'].mode()[0])
data['Married'] = data['Married'].fillna(data['Married'].mode()[0])
data['Education'] = data['Education'].fillna(data['Education'].mode()
```

```
[0])
data['Dependents'] = data['Dependents'].str.replace('+','')
data['Dependents'] =
data['Dependents'].fillna(data['Dependents'].mode()[0])
data['Self_Employed'] =
data['Self_Employed'].fillna(data['Self_Employed'].mode()[0])
data['LoanAmount'] =
data['LoanAmount'].fillna(data['LoanAmount'].mode()[0])
data['Loan_Amount_Term'] =
data['Loan_Amount_Term'].fillna(data['Loan_Amount_Term'].mode()[0])
data['Credit_History'] =
data['Credit_History'].fillna(data['Credit_History'].mode()[0])
```

```
C:\Users\John Weslin\AppData\Local\Temp\
ipykernel_14252\2748301049.py:4: FutureWarning: The default value of
regex will change from True to False in a future version. In addition,
single character regular expressions will *not* be treated as literal
strings when regex=True.
  data['Dependents'] = data['Dependents'].str.replace('+','')
```

```
data.isnull().sum()
```

```
Gender               0
Married              0
Dependents           0
Education            0
Self_Employed        0
ApplicantIncome      0
CoapplicantIncome    0
LoanAmount           0
Loan_Amount_Term     0
Credit_History       0
Property_Area        0
Loan_Status          0
dtype: int64
```

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 614 entries, 0 to 613
Data columns (total 12 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   Gender             614 non-null    float64
 1   Married            614 non-null    float64
 2   Dependents         614 non-null    object
 3   Education          614 non-null    float64
```

```
 4   Self_Employed      614 non-null    float64
 5   ApplicantIncome    614 non-null    int64
 6   CoapplicantIncome  614 non-null    float64
 7   LoanAmount         614 non-null    float64
 8   Loan_Amount_Term   614 non-null    float64
 9   Credit_History     614 non-null    float64
 10  Property_Area      614 non-null    int64
 11  Loan_Status        614 non-null    int64
dtypes: float64(8), int64(3), object(1)
memory usage: 57.7+ KB
```

```
data['Gender']=data['Gender'].astype('int64')
data['Married']=data['Married'].astype('int64')
data['Education']=data['Education'].astype('int64')
data['Dependents']=data['Dependents'].astype('int64')
data['CoapplicantIncome']=data['CoapplicantIncome'].astype('int64')
data['LoanAmount']=data['LoanAmount'].astype('int64')
data['Loan_Amount_Term']=data['Loan_Amount_Term'].astype('int64')
data['Credit_History']=data['Credit_History'].astype('int64')

data['Self_Employed']=data['Self_Employed'].astype('int64')

data.info()
```

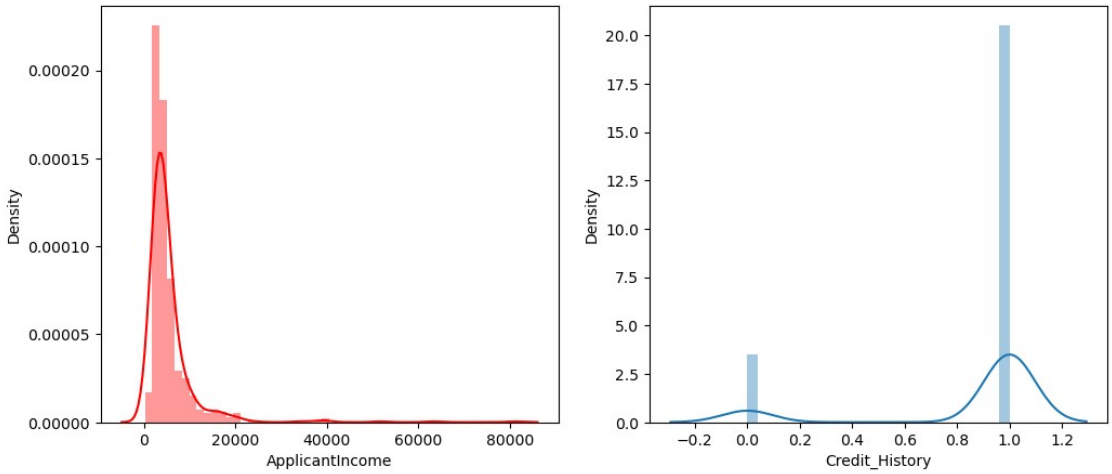
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 614 entries, 0 to 613
Data columns (total 12 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   Gender             614 non-null    int64
 1   Married            614 non-null    int64
 2   Dependents         614 non-null    int64
 3   Education          614 non-null    int64
 4   Self_Employed      614 non-null    int64
 5   ApplicantIncome    614 non-null    int64
 6   CoapplicantIncome  614 non-null    int64
 7   LoanAmount         614 non-null    int64
 8   Loan_Amount_Term   614 non-null    int64
 9   Credit_History     614 non-null    int64
 10  Property_Area      614 non-null    int64
 11  Loan_Status        614 non-null    int64
dtypes: int64(12)
memory usage: 57.7 KB
```

Data Visualization

```
plt.figure(figsize=(12,5))
plt.subplot(121)
sns.distplot(data['ApplicantIncome'], color='r')
plt.subplot(122)
```

```
sns.distplot(data['Credit_History'])
plt.show()
```

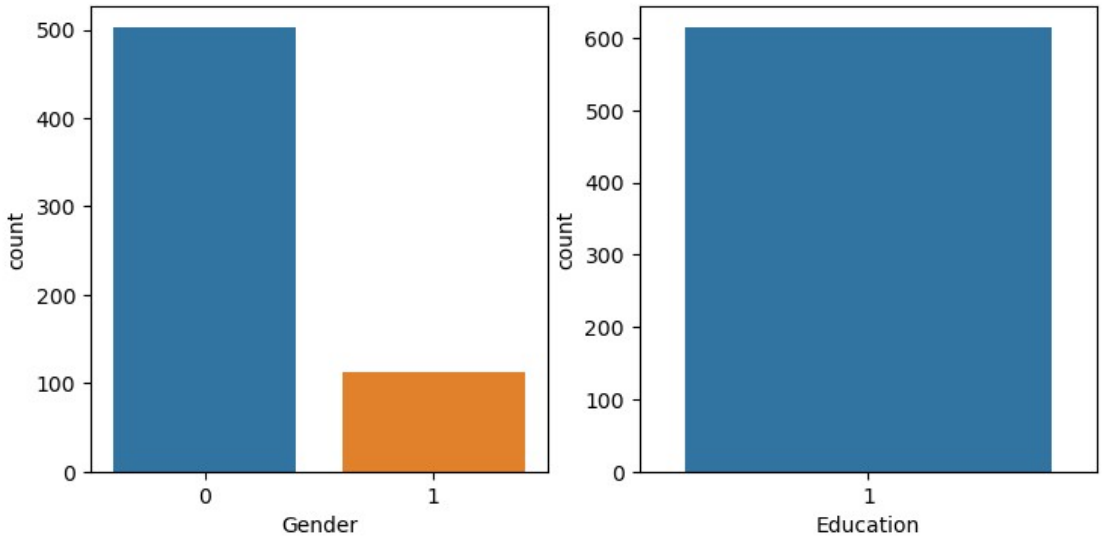
```
C:\Users\John Weslin\anaconda3\lib\site-packages\seaborn\
distributions.py:2619: FutureWarning: `distplot` is a deprecated
function and will be removed in a future version. Please adapt your
code to use either `displot` (a figure-level function with similar
flexibility) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
C:\Users\John Weslin\anaconda3\lib\site-packages\seaborn\
distributions.py:2619: FutureWarning: `distplot` is a deprecated
function and will be removed in a future version. Please adapt your
code to use either `displot` (a figure-level function with similar
flexibility) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```




```
plt.figure(figsize=(18,4))
plt.subplot(1,4,1)
sns.countplot(data['Gender'])

plt.subplot(1,4,2)
sns.countplot(data['Education'])
plt.show()
```

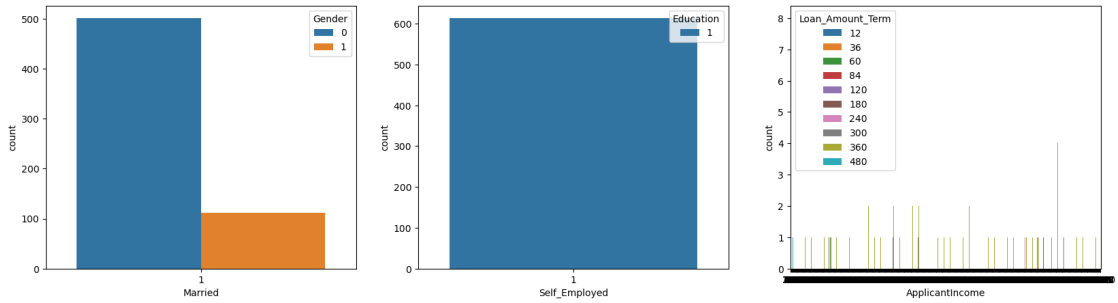
```
C:\Users\John Weslin\anaconda3\lib\site-packages\seaborn\
_decorators.py:36: FutureWarning: Pass the following variable as a
keyword arg: x. From version 0.12, the only valid positional argument
will be `data`, and passing other arguments without an explicit
keyword will result in an error or misinterpretation.
  warnings.warn(
C:\Users\John Weslin\anaconda3\lib\site-packages\seaborn\
_decorators.py:36: FutureWarning: Pass the following variable as a
keyword arg: x. From version 0.12, the only valid positional argument
will be `data`, and passing other arguments without an explicit
keyword will result in an error or misinterpretation.
  warnings.warn(
```



```
plt.figure(figsize=(20,5))
plt.subplot(131)
sns.countplot(data['Married'], hue=data['Gender'])
plt.subplot(132)
sns.countplot(data['Self_Employed'], hue=data['Education'])
plt.subplot(133)
sns.countplot(data['ApplicantIncome'], hue=data['Loan_Amount_Term'])
```

```
C:\Users\John Weslin\anaconda3\lib\site-packages\seaborn\
_decorators.py:36: FutureWarning: Pass the following variable as a
keyword arg: x. From version 0.12, the only valid positional argument
will be `data`, and passing other arguments without an explicit
keyword will result in an error or misinterpretation.
  warnings.warn(
C:\Users\John Weslin\anaconda3\lib\site-packages\seaborn\
_decorators.py:36: FutureWarning: Pass the following variable as a
keyword arg: x. From version 0.12, the only valid positional argument
will be `data`, and passing other arguments without an explicit
keyword will result in an error or misinterpretation.
  warnings.warn(
C:\Users\John Weslin\anaconda3\lib\site-packages\seaborn\
_decorators.py:36: FutureWarning: Pass the following variable as a
keyword arg: x. From version 0.12, the only valid positional argument
will be `data`, and passing other arguments without an explicit
keyword will result in an error or misinterpretation.
  warnings.warn(
```

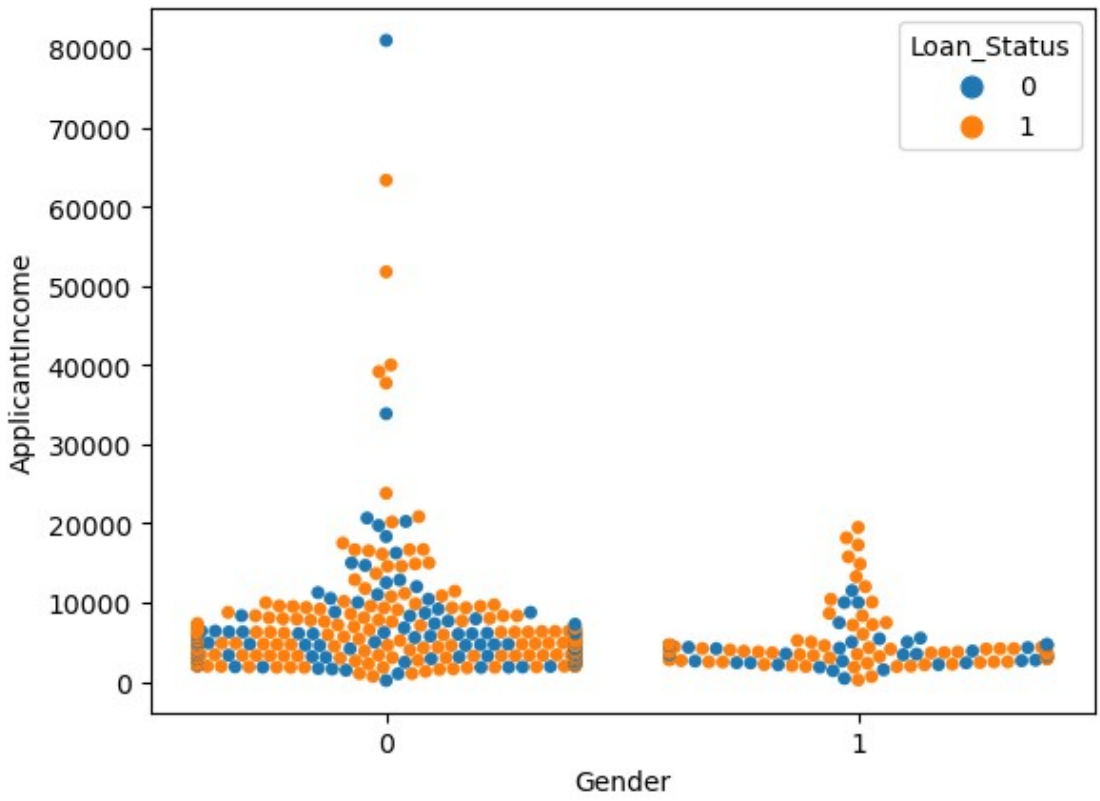
```
<AxesSubplot:xlabel='ApplicantIncome', ylabel='count'>
```




```
sns.swarmplot(data['Gender'],data['ApplicantIncome'], hue =
data['Loan_Status'])
```

```
C:\Users\John Weslin\anaconda3\lib\site-packages\seaborn\
_decorators.py:36: FutureWarning: Pass the following variables as
keyword args: x, y. From version 0.12, the only valid positional
argument will be `data`, and passing other arguments without an
explicit keyword will result in an error or misinterpretation.
  warnings.warn(
C:\Users\John Weslin\anaconda3\lib\site-packages\seaborn\
categorical.py:1296: UserWarning: 61.6% of the points cannot be
placed; you may want to decrease the size of the markers or use
stripplot.
  warnings.warn(msg, UserWarning)
C:\Users\John Weslin\anaconda3\lib\site-packages\seaborn\
categorical.py:1296: UserWarning: 25.0% of the points cannot be
placed; you may want to decrease the size of the markers or use
stripplot.
  warnings.warn(msg, UserWarning)
```

```
<AxesSubplot:xlabel='Gender', ylabel='ApplicantIncome'>
```



Balancing the Dataset

```
from imblearn.combine import SMOTETomek

smote = SMOTETomek()

y = data['Loan_Status']

x = data.drop(columns=['Loan_Status'],axis=1)

x.shape

(614, 11)

y.shape

(614,)

x_bal,y_bal = smote.fit_resample(x,y)

print(y.value_counts())
print(y_bal.value_counts())

1    422
0    192
Name: Loan_Status, dtype: int64
1    356
```

```
0    356
Name: Loan_Status, dtype: int64
```

```
names = x_bal.columns
```

```
x_bal.head()
```

```
   Gender  Married  Dependents  Education  Self_Employed
ApplicantIncome  \
0       0        1           0          1              1
5849
1       0        1           1          1              1
4583
2       0        1           0          1              1
3000
3       0        1           0          1              1
2583
4       0        1           0          1              1
6000

   CoapplicantIncome  LoanAmount  Loan_Amount_Term  Credit_History  \
0                  0         120               360               1
1               1508         128               360               1
2                  0          66               360               1
3               2358         120               360               1
4                  0         141               360               1

   Property_Area
0              2
1              0
2              2
3              2
4              2
```

SCalling the dataset

```
sc=StandardScaler()
x_bal=sc.fit_transform(x_bal)
```

```
X_train, X_test, y_train, y_test = train_test_split(x_bal, y_bal,
test_size=0.33, random_state=42)
```

```
X_train.shape
```

```
(477, 11)
```

```
X_test.shape
```

```
(235, 11)
```

```
y_train.shape, y_test.shape
```

```
((477,), (235,))
```

```
def RandomForest(X_train,X_test, y_train, y_test):
    model = RandomForestClassifier()
    model.fit(X_train,y_train)
    y_tr = model.predict(X_train)
    print(accuracy_score(y_tr,y_train))
    yPred = model.predict(X_test)
    print(accuracy_score(yPred,y_test))

RandomForest(X_train,X_test,y_train,y_test)
```

```
1.0
0.825531914893617
```

```
def decisionTree(X_train,X_test, y_train, y_test):
    model = DecisionTreeClassifier()
    model.fit(X_train,y_train)
    y_tr = model.predict(X_train)
    print(accuracy_score(y_tr,y_train))
    yPred = model.predict(X_test)
    print(accuracy_score(yPred,y_test))



decisionTree(X_train,X_test, y_train, y_test)
```

```
1.0
0.7914893617021277
```

```
def KNN(X_train,X_test, y_train, y_test):
    model = KNeighborsClassifier()
    model.fit(X_train,y_train)
    y_tr = model.predict(X_train)
    print(accuracy_score(y_tr,y_train))
    yPred = model.predict(X_test)
    print(accuracy_score(yPred,y_test))

KNN(X_train,X_test, y_train, y_test)
```

```
0.8385744234800838
0.7702127659574468

C:\Users\John Weslin\anaconda3\lib\site-packages\sklearn\neighbors\
_classification.py:228: FutureWarning: Unlike other reduction
functions (e.g. `skew`, `kurtosis`), the default behavior of `mode`
typically preserves the axis it acts along. In SciPy 1.11.0, this
behavior will change: the default value of `keepdims` will become
False, the `axis` over which the statistic is taken will be
eliminated, and the value None will no longer be accepted. Set
`keepdims` to True or False to avoid this warning.
  mode, _ = stats.mode(_y[neigh_ind, k], axis=1)
C:\Users\John Weslin\anaconda3\lib\site-packages\sklearn\neighbors\
_classification.py:228: FutureWarning: Unlike other reduction
```

```
functions (e.g. `skew`, `kurtosis`), the default behavior of `mode`
typically preserves the axis it acts along. In SciPy 1.11.0, this
behavior will change: the default value of `keepdims` will become
False, the `axis` over which the statistic is taken will be
eliminated, and the value None will no longer be accepted. Set
`keepdims` to True or False to avoid this warning.
  mode, _ = stats.mode(_y[neigh_ind, k], axis=1)
```

```
def XGB(X_train,X_test, y_train, y_test):
    model = GradientBoostingClassifier()
    model.fit(X_train,y_train)
    y_tr = model.predict(X_train)
    print(accuracy_score(y_tr,y_train))
    yPred = model.predict(X_test)
    print(accuracy_score(yPred,y_test))

XGB(X_train,X_test, y_train, y_test)
```

```
0.9203354297693921
0.8085106382978723
```

```
pip install tensorflow
```

```
Requirement already satisfied: tensorflow in c:\users\john weslin\
anaconda3\lib\site-packages (2.12.0)
Requirement already satisfied: tensorflow-intel==2.12.0 in c:\users\
john weslin\anaconda3\lib\site-packages (from tensorflow) (2.12.0)
Requirement already satisfied: keras<2.13,>=2.12.0 in c:\users\john
weslin\anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (2.12.0)
Requirement already satisfied: libclang>=13.0.0 in c:\users\john
weslin\anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (16.0.0)
Requirement already satisfied: jax>=0.3.15 in c:\users\john weslin\
anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (0.4.8)
Requirement already satisfied: grpcio<2.0,>=1.24.3 in c:\users\john
weslin\anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (1.53.0)
Requirement already satisfied: tensorboard<2.13,>=2.12 in c:\users\
john weslin\anaconda3\lib\site-packages (from tensorflow-
intel==2.12.0->tensorflow) (2.12.2)
Requirement already satisfied: flatbuffers>=2.0 in c:\users\john
weslin\anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (23.3.3)
Requirement already satisfied: h5py>=2.9.0 in c:\users\john weslin\
anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (3.7.0)
Requirement already satisfied: astunparse>=1.6.0 in c:\users\john
weslin\anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (1.6.3)
```

```
Requirement already satisfied: termcolor>=1.1.0 in c:\users\john
weslin\anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (2.2.0)
Requirement already satisfied: typing-extensions>=3.6.6 in c:\users\
john weslin\anaconda3\lib\site-packages (from tensorflow-
intel==2.12.0->tensorflow) (4.3.0)
Requirement already satisfied: six>=1.12.0 in c:\users\john weslin\
anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (1.16.0)
Requirement already satisfied: packaging in c:\users\john weslin\
anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (21.3)
Requirement already satisfied: tensorflow-estimator<2.13,>=2.12.0 in
c:\users\john weslin\anaconda3\lib\site-packages (from tensorflow-
intel==2.12.0->tensorflow) (2.12.0)
Requirement already satisfied: google-pasta>=0.1.1 in c:\users\john
weslin\anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (0.2.0)
Requirement already satisfied: numpy<1.24,>=1.22 in c:\users\john
weslin\anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (1.23.5)
Requirement already satisfied: gast<=0.4.0,>=0.2.1 in c:\users\john
weslin\anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (0.4.0)
Requirement already satisfied: tensorflow-io-gcs-filesystem>=0.23.1 in
c:\users\john weslin\anaconda3\lib\site-packages (from tensorflow-
intel==2.12.0->tensorflow) (0.31.0)
Requirement already satisfied: absl-py>=1.0.0 in c:\users\john weslin\
anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (1.4.0)
Requirement already satisfied: wrapt<1.15,>=1.11.0 in c:\users\john
weslin\anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (1.14.1)
Requirement already satisfied: opt-einsum>=2.3.2 in c:\users\john
weslin\anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (3.3.0)
Requirement already satisfied: protobuf!=4.21.0,!=4.21.1,!=4.21.2,!
=4.21.3,!=4.21.4,!=4.21.5,<5.0.0dev,>=3.20.3 in c:\users\john weslin\
anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (4.22.3)
Requirement already satisfied: setuptools in c:\users\john weslin\
anaconda3\lib\site-packages (from tensorflow-intel==2.12.0-
>tensorflow) (63.4.1)
Requirement already satisfied: wheel<1.0,>=0.23.0 in c:\users\john
weslin\anaconda3\lib\site-packages (from astunparse>=1.6.0-
>tensorflow-intel==2.12.0->tensorflow) (0.37.1)
Requirement already satisfied: scipy>=1.7 in c:\users\john weslin\
anaconda3\lib\site-packages (from jax>=0.3.15->tensorflow-
intel==2.12.0->tensorflow) (1.9.1)
Requirement already satisfied: ml-dtypes>=0.0.3 in c:\users\john
```

```
weslin\anaconda3\lib\site-packages (from jax>=0.3.15->tensorflow-
intel==2.12.0->tensorflow) (0.1.0)
Requirement already satisfied: markdown>=2.6.8 in c:\users\john
weslin\anaconda3\lib\site-packages (from tensorboard<2.13,>=2.12-
>tensorflow-intel==2.12.0->tensorflow) (3.3.4)
Requirement already satisfied: tensorboard-data-server<0.8.0,>=0.7.0
in c:\users\john weslin\anaconda3\lib\site-packages (from
tensorboard<2.13,>=2.12->tensorflow-intel==2.12.0->tensorflow) (0.7.0)
Requirement already satisfied: google-auth-oauthlib<1.1,>=0.5 in c:\
users\john weslin\anaconda3\lib\site-packages (from
tensorboard<2.13,>=2.12->tensorflow-intel==2.12.0->tensorflow) (1.0.0)
Requirement already satisfied: requests<3,>=2.21.0 in c:\users\john
weslin\anaconda3\lib\site-packages (from tensorboard<2.13,>=2.12-
>tensorflow-intel==2.12.0->tensorflow) (2.28.1)
Requirement already satisfied: werkzeug>=1.0.1 in c:\users\john
weslin\anaconda3\lib\site-packages (from tensorboard<2.13,>=2.12-
>tensorflow-intel==2.12.0->tensorflow) (2.0.3)
Requirement already satisfied: tensorboard-plugin-wit>=1.6.0 in c:\
users\john weslin\anaconda3\lib\site-packages (from
tensorboard<2.13,>=2.12->tensorflow-intel==2.12.0->tensorflow) (1.8.1)
Requirement already satisfied: google-auth<3,>=1.6.3 in c:\users\john
weslin\anaconda3\lib\site-packages (from tensorboard<2.13,>=2.12-
>tensorflow-intel==2.12.0->tensorflow) (2.17.3)
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in c:\users\
john weslin\anaconda3\lib\site-packages (from packaging->tensorflow-
intel==2.12.0->tensorflow) (3.0.9)
Requirement already satisfied: pyasn1-modules>=0.2.1 in c:\users\john
weslin\anaconda3\lib\site-packages (from google-auth<3,>=1.6.3-
>tensorboard<2.13,>=2.12->tensorflow-intel==2.12.0->tensorflow)
(0.2.8)
Requirement already satisfied: cachetools<6.0,>=2.0.0 in c:\users\john
weslin\anaconda3\lib\site-packages (from google-auth<3,>=1.6.3-
>tensorboard<2.13,>=2.12->tensorflow-intel==2.12.0->tensorflow)
(5.3.0)
Requirement already satisfied: rsa<5,>=3.1.4 in c:\users\john weslin\
anaconda3\lib\site-packages (from google-auth<3,>=1.6.3-
>tensorboard<2.13,>=2.12->tensorflow-intel==2.12.0->tensorflow) (4.9)
Requirement already satisfied: requests-oauthlib>=0.7.0 in c:\users\
john weslin\anaconda3\lib\site-packages (from google-auth-
oauthlib<1.1,>=0.5->tensorboard<2.13,>=2.12->tensorflow-intel==2.12.0-
>tensorflow) (1.3.1)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in c:\users\john
weslin\anaconda3\lib\site-packages (from requests<3,>=2.21.0-
>tensorboard<2.13,>=2.12->tensorflow-intel==2.12.0->tensorflow)
(1.26.11)
Requirement already satisfied: charset-normalizer<3,>=2 in c:\users\
john weslin\anaconda3\lib\site-packages (from requests<3,>=2.21.0-
>tensorboard<2.13,>=2.12->tensorflow-intel==2.12.0->tensorflow)
(2.0.4)
Requirement already satisfied: idna<4,>=2.5 in c:\users\john weslin\
```

```
anaconda3\lib\site-packages (from requests<3,>=2.21.0-
>tensorboard<2.13,>=2.12->tensorflow-intel==2.12.0->tensorflow) (3.3)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\john
weslin\anaconda3\lib\site-packages (from requests<3,>=2.21.0-
>tensorboard<2.13,>=2.12->tensorflow-intel==2.12.0->tensorflow)
(2022.9.14)
Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in c:\users\john
weslin\anaconda3\lib\site-packages (from pyasn1-modules>=0.2.1-
>google-auth<3,>=1.6.3->tensorboard<2.13,>=2.12->tensorflow-
intel==2.12.0->tensorflow) (0.4.8)
Requirement already satisfied: oauthlib>=3.0.0 in c:\users\john
weslin\anaconda3\lib\site-packages (from requests-oauthlib>=0.7.0-
>google-auth-oauthlib<1.1,>=0.5->tensorboard<2.13,>=2.12->tensorflow-
intel==2.12.0->tensorflow) (3.2.2)
Note: you may need to restart the kernel to use updated packages.
```

```
import tensorflow
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense

classifier = Sequential()

classifier.add(Dense(units=100, activation='relu', input_dim=11))

classifier.add(Dense(units=50, activation='relu'))

classifier.add(Dense(units=1, activation='sigmoid'))

classifier.compile(optimizer='adam', loss='binary_crossentropy',
metrics=['accuracy'])

classifier.fit(X_train, y_train, batch_size=100, validation_split=0.2,
epochs=100)
```

```
Epoch 1/100
4/4 [==============================] - 1s 82ms/step - loss: 0.7018 -
accuracy: 0.5118 - val_loss: 0.6699 - val_accuracy: 0.5833
Epoch 2/100
4/4 [==============================] - 0s 13ms/step - loss: 0.6598 -
accuracy: 0.6430 - val_loss: 0.6430 - val_accuracy: 0.7292
Epoch 3/100
4/4 [==============================] - 0s 13ms/step - loss: 0.6214 -
accuracy: 0.7585 - val_loss: 0.6158 - val_accuracy: 0.7708
Epoch 4/100
4/4 [==============================] - 0s 13ms/step - loss: 0.5898 -
accuracy: 0.7717 - val_loss: 0.5913 - val_accuracy: 0.7708
Epoch 5/100
4/4 [==============================] - 0s 13ms/step - loss: 0.5614 -
accuracy: 0.7690 - val_loss: 0.5676 - val_accuracy: 0.7708
Epoch 6/100
4/4 [==============================] - 0s 13ms/step - loss: 0.5362 -
accuracy: 0.7717 - val_loss: 0.5493 - val_accuracy: 0.7604
```

```
Epoch 7/100
4/4 [==============================] - 0s 13ms/step - loss: 0.5147 -
accuracy: 0.7743 - val_loss: 0.5359 - val_accuracy: 0.7604
Epoch 8/100
4/4 [==============================] - 0s 13ms/step - loss: 0.4965 -
accuracy: 0.7848 - val_loss: 0.5258 - val_accuracy: 0.7604
Epoch 9/100
4/4 [==============================] - 0s 13ms/step - loss: 0.4818 -
accuracy: 0.7874 - val_loss: 0.5202 - val_accuracy: 0.7500
Epoch 10/100
4/4 [==============================] - 0s 15ms/step - loss: 0.4699 -
accuracy: 0.7927 - val_loss: 0.5185 - val_accuracy: 0.7500
Epoch 11/100
4/4 [==============================] - 0s 18ms/step - loss: 0.4583 -
accuracy: 0.7953 - val_loss: 0.5196 - val_accuracy: 0.7500
Epoch 12/100
4/4 [==============================] - 0s 15ms/step - loss: 0.4500 -
accuracy: 0.8005 - val_loss: 0.5231 - val_accuracy: 0.7500
Epoch 13/100
4/4 [==============================] - 0s 13ms/step - loss: 0.4442 -
accuracy: 0.8031 - val_loss: 0.5270 - val_accuracy: 0.7500
Epoch 14/100
4/4 [==============================] - 0s 14ms/step - loss: 0.4377 -
accuracy: 0.8031 - val_loss: 0.5277 - val_accuracy: 0.7500
Epoch 15/100
4/4 [==============================] - 0s 13ms/step - loss: 0.4334 -
accuracy: 0.8031 - val_loss: 0.5285 - val_accuracy: 0.7500
Epoch 16/100
4/4 [==============================] - 0s 13ms/step - loss: 0.4289 -
accuracy: 0.8031 - val_loss: 0.5309 - val_accuracy: 0.7500
Epoch 17/100
4/4 [==============================] - 0s 14ms/step - loss: 0.4248 -
accuracy: 0.8031 - val_loss: 0.5335 - val_accuracy: 0.7500
Epoch 18/100
4/4 [==============================] - 0s 14ms/step - loss: 0.4219 -
accuracy: 0.8031 - val_loss: 0.5353 - val_accuracy: 0.7396
Epoch 19/100
4/4 [==============================] - 0s 13ms/step - loss: 0.4181 -
accuracy: 0.8084 - val_loss: 0.5371 - val_accuracy: 0.7396
Epoch 20/100
4/4 [==============================] - 0s 13ms/step - loss: 0.4148 -
accuracy: 0.8084 - val_loss: 0.5401 - val_accuracy: 0.7396
Epoch 21/100
4/4 [==============================] - 0s 13ms/step - loss: 0.4123 -
accuracy: 0.8136 - val_loss: 0.5438 - val_accuracy: 0.7396
Epoch 22/100
4/4 [==============================] - 0s 14ms/step - loss: 0.4100 -
accuracy: 0.8163 - val_loss: 0.5438 - val_accuracy: 0.7396
Epoch 23/100
4/4 [==============================] - 0s 13ms/step - loss: 0.4069 -
```

```
accuracy: 0.8163 - val_loss: 0.5471 - val_accuracy: 0.7396
Epoch 24/100
4/4 [==============================] - 0s 13ms/step - loss: 0.4048 -
accuracy: 0.8163 - val_loss: 0.5490 - val_accuracy: 0.7396
Epoch 25/100
4/4 [==============================] - 0s 14ms/step - loss: 0.4024 -
accuracy: 0.8189 - val_loss: 0.5507 - val_accuracy: 0.7292
Epoch 26/100
4/4 [==============================] - 0s 13ms/step - loss: 0.4001 -
accuracy: 0.8215 - val_loss: 0.5520 - val_accuracy: 0.7292
Epoch 27/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3980 -
accuracy: 0.8189 - val_loss: 0.5521 - val_accuracy: 0.7292
Epoch 28/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3957 -
accuracy: 0.8215 - val_loss: 0.5542 - val_accuracy: 0.7188
Epoch 29/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3935 -
accuracy: 0.8215 - val_loss: 0.5575 - val_accuracy: 0.7188
Epoch 30/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3922 -
accuracy: 0.8215 - val_loss: 0.5602 - val_accuracy: 0.7292
Epoch 31/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3898 -
accuracy: 0.8215 - val_loss: 0.5635 - val_accuracy: 0.7188
Epoch 32/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3874 -
accuracy: 0.8268 - val_loss: 0.5660 - val_accuracy: 0.7083
Epoch 33/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3857 -
accuracy: 0.8294 - val_loss: 0.5682 - val_accuracy: 0.7083
Epoch 34/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3837 -
accuracy: 0.8294 - val_loss: 0.5695 - val_accuracy: 0.7083
Epoch 35/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3823 -
accuracy: 0.8268 - val_loss: 0.5707 - val_accuracy: 0.7083
Epoch 36/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3802 -
accuracy: 0.8268 - val_loss: 0.5718 - val_accuracy: 0.7083
Epoch 37/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3795 -
accuracy: 0.8268 - val_loss: 0.5722 - val_accuracy: 0.7188
Epoch 38/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3770 -
accuracy: 0.8268 - val_loss: 0.5765 - val_accuracy: 0.7083
Epoch 39/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3753 -
accuracy: 0.8268 - val_loss: 0.5811 - val_accuracy: 0.7188
Epoch 40/100
```

```
4/4 [==============================] - 0s 13ms/step - loss: 0.3751 -
accuracy: 0.8320 - val_loss: 0.5879 - val_accuracy: 0.7188
Epoch 41/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3725 -
accuracy: 0.8346 - val_loss: 0.5862 - val_accuracy: 0.7083
Epoch 42/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3710 -
accuracy: 0.8320 - val_loss: 0.5865 - val_accuracy: 0.7083
Epoch 43/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3690 -
accuracy: 0.8294 - val_loss: 0.5906 - val_accuracy: 0.7083
Epoch 44/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3670 -
accuracy: 0.8320 - val_loss: 0.5965 - val_accuracy: 0.7083
Epoch 45/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3658 -
accuracy: 0.8320 - val_loss: 0.5996 - val_accuracy: 0.7083
Epoch 46/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3642 -
accuracy: 0.8346 - val_loss: 0.6005 - val_accuracy: 0.7083
Epoch 47/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3626 -
accuracy: 0.8320 - val_loss: 0.6013 - val_accuracy: 0.7083
Epoch 48/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3611 -
accuracy: 0.8320 - val_loss: 0.6027 - val_accuracy: 0.7083
Epoch 49/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3595 -
accuracy: 0.8320 - val_loss: 0.6050 - val_accuracy: 0.7083
Epoch 50/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3579 -
accuracy: 0.8320 - val_loss: 0.6097 - val_accuracy: 0.7083
Epoch 51/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3564 -
accuracy: 0.8346 - val_loss: 0.6145 - val_accuracy: 0.7083
Epoch 52/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3553 -
accuracy: 0.8399 - val_loss: 0.6149 - val_accuracy: 0.7188
Epoch 53/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3533 -
accuracy: 0.8399 - val_loss: 0.6164 - val_accuracy: 0.7083
Epoch 54/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3525 -
accuracy: 0.8346 - val_loss: 0.6171 - val_accuracy: 0.7083
Epoch 55/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3508 -
accuracy: 0.8346 - val_loss: 0.6207 - val_accuracy: 0.7083
Epoch 56/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3491 -
accuracy: 0.8373 - val_loss: 0.6225 - val_accuracy: 0.7083
```

```
Epoch 57/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3482 -
accuracy: 0.8399 - val_loss: 0.6270 - val_accuracy: 0.7292
Epoch 58/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3469 -
accuracy: 0.8399 - val_loss: 0.6280 - val_accuracy: 0.7083
Epoch 59/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3452 -
accuracy: 0.8399 - val_loss: 0.6311 - val_accuracy: 0.7188
Epoch 60/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3438 -
accuracy: 0.8399 - val_loss: 0.6342 - val_accuracy: 0.7188
Epoch 61/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3424 -
accuracy: 0.8425 - val_loss: 0.6370 - val_accuracy: 0.7188
Epoch 62/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3412 -
accuracy: 0.8425 - val_loss: 0.6386 - val_accuracy: 0.7188
Epoch 63/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3397 -
accuracy: 0.8425 - val_loss: 0.6425 - val_accuracy: 0.7188
Epoch 64/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3381 -
accuracy: 0.8399 - val_loss: 0.6451 - val_accuracy: 0.7188
Epoch 65/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3369 -
accuracy: 0.8399 - val_loss: 0.6451 - val_accuracy: 0.7188
Epoch 66/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3357 -
accuracy: 0.8425 - val_loss: 0.6488 - val_accuracy: 0.7292
Epoch 67/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3350 -
accuracy: 0.8399 - val_loss: 0.6494 - val_accuracy: 0.7188
Epoch 68/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3332 -
accuracy: 0.8399 - val_loss: 0.6532 - val_accuracy: 0.7188
Epoch 69/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3320 -
accuracy: 0.8399 - val_loss: 0.6583 - val_accuracy: 0.7292
Epoch 70/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3305 -
accuracy: 0.8425 - val_loss: 0.6621 - val_accuracy: 0.7188
Epoch 71/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3290 -
accuracy: 0.8399 - val_loss: 0.6639 - val_accuracy: 0.7188
Epoch 72/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3277 -
accuracy: 0.8425 - val_loss: 0.6674 - val_accuracy: 0.7188
Epoch 73/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3263 -
```

```
accuracy: 0.8425 - val_loss: 0.6706 - val_accuracy: 0.7188
Epoch 74/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3256 -
accuracy: 0.8451 - val_loss: 0.6723 - val_accuracy: 0.7188
Epoch 75/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3244 -
accuracy: 0.8425 - val_loss: 0.6745 - val_accuracy: 0.7188
Epoch 76/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3225 -
accuracy: 0.8451 - val_loss: 0.6795 - val_accuracy: 0.7188
Epoch 77/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3214 -
accuracy: 0.8556 - val_loss: 0.6835 - val_accuracy: 0.7188
Epoch 78/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3205 -
accuracy: 0.8583 - val_loss: 0.6833 - val_accuracy: 0.7188
Epoch 79/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3195 -
accuracy: 0.8504 - val_loss: 0.6823 - val_accuracy: 0.7292
Epoch 80/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3183 -
accuracy: 0.8504 - val_loss: 0.6833 - val_accuracy: 0.7188
Epoch 81/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3173 -
accuracy: 0.8556 - val_loss: 0.6847 - val_accuracy: 0.7188
Epoch 82/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3152 -
accuracy: 0.8556 - val_loss: 0.6907 - val_accuracy: 0.7292
Epoch 83/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3142 -
accuracy: 0.8556 - val_loss: 0.6949 - val_accuracy: 0.7292
Epoch 84/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3132 -
accuracy: 0.8556 - val_loss: 0.6998 - val_accuracy: 0.7292
Epoch 85/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3119 -
accuracy: 0.8583 - val_loss: 0.7024 - val_accuracy: 0.7188
Epoch 86/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3116 -
accuracy: 0.8609 - val_loss: 0.7044 - val_accuracy: 0.7188
Epoch 87/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3101 -
accuracy: 0.8583 - val_loss: 0.6963 - val_accuracy: 0.7188
Epoch 88/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3092 -
accuracy: 0.8583 - val_loss: 0.6970 - val_accuracy: 0.7188
Epoch 89/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3071 -
accuracy: 0.8609 - val_loss: 0.7014 - val_accuracy: 0.7188
Epoch 90/100
```

```
4/4 [==============================] - 0s 14ms/step - loss: 0.3067 -
accuracy: 0.8609 - val_loss: 0.7133 - val_accuracy: 0.7188
Epoch 91/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3053 -
accuracy: 0.8583 - val_loss: 0.7168 - val_accuracy: 0.7083
Epoch 92/100
4/4 [==============================] - 0s 14ms/step - loss: 0.3043 -
accuracy: 0.8583 - val_loss: 0.7135 - val_accuracy: 0.7292
Epoch 93/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3026 -
accuracy: 0.8609 - val_loss: 0.7187 - val_accuracy: 0.7188
Epoch 94/100
4/4 [==============================] - 0s 13ms/step - loss: 0.3009 -
accuracy: 0.8609 - val_loss: 0.7192 - val_accuracy: 0.6979
Epoch 95/100
4/4 [==============================] - 0s 13ms/step - loss: 0.2997 -
accuracy: 0.8609 - val_loss: 0.7208 - val_accuracy: 0.6979
Epoch 96/100
4/4 [==============================] - 0s 13ms/step - loss: 0.2990 -
accuracy: 0.8609 - val_loss: 0.7218 - val_accuracy: 0.6979
Epoch 97/100
4/4 [==============================] - 0s 15ms/step - loss: 0.2977 -
accuracy: 0.8609 - val_loss: 0.7260 - val_accuracy: 0.6979
Epoch 98/100
4/4 [==============================] - 0s 18ms/step - loss: 0.2962 -
accuracy: 0.8583 - val_loss: 0.7300 - val_accuracy: 0.7083
Epoch 99/100
4/4 [==============================] - 0s 14ms/step - loss: 0.2956 -
accuracy: 0.8583 - val_loss: 0.7349 - val_accuracy: 0.7083
Epoch 100/100
4/4 [==============================] - 0s 13ms/step - loss: 0.2947 -
accuracy: 0.8583 - val_loss: 0.7370 - val_accuracy: 0.7083

<keras.callbacks.History at 0x23617037fa0>

y_pred = classifier.predict(X_test)

8/8 [==============================] - 0s 1ms/step

y_pred

array([[9.2852533e-01],
       [9.5907599e-01],
       [9.5137173e-01],
       [7.5093406e-01],
       [7.5744623e-01],
       [9.1569331e-03],
       [8.7217927e-01],
       [5.6239843e-01],
       [6.8162280e-01],
       [9.6190411e-01],
```

[9.3709922e-01],
[9.7276872e-01],
[6.4675039e-01],
[1.4401569e-03],
[3.0364953e-03],
[2.5769052e-04],
[3.8820960e-02],
[6.5119487e-01],
[9.0054542e-01],
[8.4974259e-01],
[5.9655055e-02],
[5.9313822e-01],
[7.9553545e-04],
[7.2076127e-02],
[9.6579099e-01],
[3.2926288e-03],
[8.8511139e-01],
[1.7731576e-03],
[8.4763831e-01],
[6.8593401e-01],
[1.7199653e-01],
[1.4478601e-04],
[9.5165378e-01],
[2.0974265e-02],
[9.8934710e-01],
[9.2613363e-01],
[7.3772186e-01],
[6.2978321e-01],
[9.4815660e-03],
[6.3345772e-01],
[8.4711681e-04],
[9.5864427e-01],
[1.3107243e-01],
[9.5311964e-01],
[6.6408885e-01],
[7.8320742e-01],
[1.0738556e-02],
[3.5664856e-01],
[3.0657754e-03],
[1.4558440e-03],
[7.6450753e-01],
[3.0098013e-03],
[8.9697504e-01],
[6.4572924e-01],
[9.3009503e-04],
[9.0453589e-01],
[1.8447077e-01],
[8.0723744e-03],
[9.0276396e-01],
[7.0370138e-01],

[7.6271826e-01],
[4.6317399e-01],
[9.6304023e-01],
[1.3778760e-01],
[5.9447253e-01],
[5.8297294e-01],
[5.3776485e-01],
[3.3952239e-01],
[9.1307539e-01],
[3.6138824e-01],
[1.5981811e-03],
[6.9938391e-01],
[9.0190744e-01],
[1.4459078e-03],
[7.6991808e-01],
[4.7912040e-01],
[9.5044893e-01],
[8.5909021e-01],
[9.6135575e-01],
[9.1027606e-01],
[9.3706721e-01],
[1.8077858e-02],
[7.1199530e-01],
[4.1440934e-01],
[8.0739337e-01],
[7.0021647e-01],
[3.3897601e-02],
[7.6464784e-01],
[6.9198072e-01],
[4.9685469e-01],
[3.1825736e-02],
[4.4225559e-01],
[3.7661189e-01],
[2.1486077e-03],
[9.7716367e-01],
[6.4085566e-02],
[5.2637106e-01],
[7.4261749e-01],
[4.1215473e-01],
[2.3927288e-03],
[9.6974057e-01],
[2.5919236e-03],
[3.2441486e-02],
[1.4775377e-03],
[9.5335591e-01],
[4.4632140e-01],
[7.2559960e-02],
[3.0649928e-03],
[8.9502364e-01],
[9.2986435e-01],

[8.1586748e-01],
[8.9738715e-01],
[8.5825372e-01],
[7.7007508e-01],
[1.1303497e-03],
[8.1475300e-01],
[1.0759740e-01],
[8.4134698e-01],
[9.9115670e-01],
[7.0867723e-01],
[2.0987697e-01],
[7.5845021e-01],
[8.2697085e-04],
[9.6641016e-01],
[7.6460040e-01],
[2.1062644e-04],
[4.7519593e-04],
[3.9318229e-06],
[6.0939938e-01],
[1.1312455e-03],
[1.8685983e-03],
[8.7556314e-01],
[7.4798375e-01],
[2.5701285e-03],
[8.9748309e-04],
[9.7838897e-01],
[2.6331341e-01],
[6.7092872e-01],
[9.1250587e-01],
[9.0742344e-01],
[1.3804911e-01],
[1.5942104e-03],
[3.5350982e-02],
[5.7549709e-01],
[4.6589994e-01],
[1.0240225e-03],
[7.0612818e-01],
[3.7603688e-01],
[4.1287225e-02],
[7.1005642e-01],
[9.8942000e-01],
[1.7413201e-03],
[6.9594282e-01],
[6.1630553e-01],
[8.4241945e-01],
[5.1322762e-02],
[1.7803114e-02],
[1.8744682e-03],
[6.8164945e-01],
[9.8219609e-01],

[7.4420798e-01],
[6.9916117e-01],
[3.4557267e-03],
[7.3946768e-01],
[9.9755393e-04],
[4.2977360e-01],
[2.2097994e-02],
[7.7913338e-01],
[3.4927158e-03],
[9.2864168e-01],
[6.9365406e-01],
[8.7250788e-03],
[7.1369010e-01],
[6.8769687e-01],
[4.2288345e-01],
[1.5698946e-01],
[3.2593105e-02],
[1.1149899e-01],
[6.7436369e-04],
[1.7542135e-02],
[1.7660534e-01],
[4.6831470e-02],
[5.5698085e-01],
[9.8468453e-01],
[1.7005727e-03],
[9.0370280e-01],
[7.8035498e-01],
[7.2786778e-01],
[5.5768716e-01],
[7.7502096e-01],
[3.7978998e-01],
[5.4853082e-01],
[8.5834128e-01],
[5.7488513e-01],
[9.2885131e-01],
[8.3703208e-01],
[9.4779444e-01],
[8.5979486e-01],
[2.3257253e-01],
[3.4076499e-03],
[3.4846659e-03],
[2.5720925e-03],
[8.8828814e-01],
[6.5979767e-01],
[4.6029267e-01],
[9.6134543e-01],
[6.6771018e-03],
[5.5827361e-01],
[3.1017268e-03],
[7.4621612e-01],

```
       [6.7739969e-01],
       [1.3269725e-01],
       [1.5073998e-03],
       [9.3488419e-01],
       [9.0213591e-01],
       [8.8357025e-01],
       [6.9098186e-01],
       [9.3973064e-01],
       [9.0665400e-01],
       [7.5777906e-01],
       [3.6477792e-01],
       [9.1402978e-01],
       [1.8441596e-03],
       [1.5676358e-03],
       [8.4439552e-01],
       [6.8151140e-01],
       [2.4725599e-04],
       [7.4559760e-01],
       [9.9945831e-01],
       [6.3749752e-03],
       [9.2799616e-01],
       [2.4513708e-02],
       [3.4618140e-03],
       [9.5551234e-01],
       [9.6864021e-01]], dtype=float32)
```

```
y_pred = y_pred.astype(int)
```

```
y_pred
```

```
array([[0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
```

[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],

[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],

[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],

[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],
[0],

```
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0],
       [0]])

print(accuracy_score(y_pred, y_test))
print("ANN Model")
print("Confusion_Matrix")
print(confusion_matrix(y_test, y_pred))
print("Classification Report")
print(classification_report(y_test, y_pred))
```

```
0.5361702127659574
ANN Model
Confusion_Matrix
[[126   0]
 [109   0]]
Classification Report
              precision    recall  f1-score   support

           0       0.54      1.00      0.70       126
           1       0.00      0.00      0.00       109

    accuracy                           0.54       235
   macro avg       0.27      0.50      0.35       235
weighted avg       0.29      0.54      0.37       235


C:\Users\John Weslin\anaconda3\lib\site-packages\sklearn\metrics\
_classification.py:1318: UndefinedMetricWarning: Precision and F-score
are ill-defined and being set to 0.0 in labels with no predicted
samples. Use `zero_division` parameter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
C:\Users\John Weslin\anaconda3\lib\site-packages\sklearn\metrics\
_classification.py:1318: UndefinedMetricWarning: Precision and F-score
are ill-defined and being set to 0.0 in labels with no predicted
samples. Use `zero_division` parameter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
C:\Users\John Weslin\anaconda3\lib\site-packages\sklearn\metrics\
```

```
_classification.py:1318: UndefinedMetricWarning: Precision and F-score
are ill-defined and being set to 0.0 in labels with no predicted
samples. Use `zero_division` parameter to control this behavior.
  _warn_prf(average, modifier, msg_start, len(result))
```

Hyper parameter tuning

```
rf = RandomForestClassifier()

parameters ={
    'n_estimators' : [1,20,30,55,68,74,90,120,115],
    'criterion' :['gini','entropy'],
    'max_features' : ["auto", "sqrt", "log2"],
    'max_depth' : [2,5,8,10], 'verbose' : [1,2,3,4,6,8,9,10]
}

RCV =
RandomizedSearchCV(estimator=rf,param_distributions=parameters,cv=10,n
_iter=4)

RCV.fit(X_train,y_train)
```

```
building tree 1 of 90
building tree 2 of 90
building tree 3 of 90
building tree 4 of 90
building tree 5 of 90
building tree 6 of 90
building tree 7 of 90
building tree 8 of 90
building tree 9 of 90
building tree 10 of 90
building tree 11 of 90
building tree 12 of 90
building tree 13 of 90
building tree 14 of 90
building tree 15 of 90
building tree 16 of 90
building tree 17 of 90
building tree 18 of 90
building tree 19 of 90
building tree 20 of 90
building tree 21 of 90
building tree 22 of 90
building tree 23 of 90
building tree 24 of 90
building tree 25 of 90
building tree 26 of 90
building tree 27 of 90
building tree 28 of 90
building tree 29 of 90
```

```
building tree 30 of 90
building tree 31 of 90
building tree 32 of 90
building tree 33 of 90
building tree 34 of 90
building tree 35 of 90
building tree 36 of 90
building tree 37 of 90
building tree 38 of 90
building tree 39 of 90
building tree 40 of 90
building tree 41 of 90
building tree 42 of 90
building tree 43 of 90
building tree 44 of 90
building tree 45 of 90
building tree 46 of 90
building tree 47 of 90
building tree 48 of 90
building tree 49 of 90
building tree 50 of 90
building tree 51 of 90
building tree 52 of 90
building tree 53 of 90
building tree 54 of 90
building tree 55 of 90
building tree 56 of 90
building tree 57 of 90
building tree 58 of 90
building tree 59 of 90
building tree 60 of 90
building tree 61 of 90
building tree 62 of 90
building tree 63 of 90
building tree 64 of 90
building tree 65 of 90
building tree 66 of 90
building tree 67 of 90
building tree 68 of 90
building tree 69 of 90
building tree 70 of 90
building tree 71 of 90
building tree 72 of 90
building tree 73 of 90
building tree 74 of 90
building tree 75 of 90
building tree 76 of 90

[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
```

```
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s

building tree 77 of 90
building tree 78 of 90
building tree 79 of 90
building tree 80 of 90
building tree 81 of 90
building tree 82 of 90
building tree 83 of 90
building tree 84 of 90
building tree 85 of 90
building tree 86 of 90
building tree 87 of 90
building tree 88 of 90
building tree 89 of 90
building tree 90 of 90
building tree 1 of 90
building tree 2 of 90
building tree 3 of 90
building tree 4 of 90
building tree 5 of 90
building tree 6 of 90
building tree 7 of 90
building tree 8 of 90
building tree 9 of 90
building tree 10 of 90
building tree 11 of 90
building tree 12 of 90
building tree 13 of 90
building tree 14 of 90
building tree 15 of 90
building tree 16 of 90
building tree 17 of 90
building tree 18 of 90
building tree 19 of 90
building tree 20 of 90
building tree 21 of 90
building tree 22 of 90
building tree 23 of 90
```

```
building tree 24 of 90
building tree 25 of 90
building tree 26 of 90
building tree 27 of 90
building tree 28 of 90
building tree 29 of 90
building tree 30 of 90
building tree 31 of 90
building tree 32 of 90
building tree 33 of 90
building tree 34 of 90
building tree 35 of 90
building tree 36 of 90
building tree 37 of 90
building tree 38 of 90
building tree 39 of 90
building tree 40 of 90
building tree 41 of 90
building tree 42 of 90
building tree 43 of 90
building tree 44 of 90
building tree 45 of 90
building tree 46 of 90
building tree 47 of 90
building tree 48 of 90
building tree 49 of 90
building tree 50 of 90
building tree 51 of 90
building tree 52 of 90
building tree 53 of 90
building tree 54 of 90
building tree 55 of 90
building tree 56 of 90
building tree 57 of 90
building tree 58 of 90
building tree 59 of 90
building tree 60 of 90
building tree 61 of 90
building tree 62 of 90
building tree 63 of 90
building tree 64 of 90
building tree 65 of 90
building tree 66 of 90
building tree 67 of 90
building tree 68 of 90
building tree 69 of 90
building tree 70 of 90
building tree 71 of 90
building tree 72 of 90
building tree 73 of 90
```

```
building tree 74 of 90
building tree 75 of 90
building tree 76 of 90
building tree 77 of 90
building tree 78 of 90
building tree 79 of 90
building tree 80 of 90
building tree 81 of 90
building tree 82 of 90
building tree 83 of 90
building tree 84 of 90
building tree 85 of 90
building tree 86 of 90
building tree 87 of 90
building tree 88 of 90
building tree 89 of 90
building tree 90 of 90

[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s

building tree 1 of 90
building tree 2 of 90
building tree 3 of 90
building tree 4 of 90
building tree 5 of 90
building tree 6 of 90
building tree 7 of 90
building tree 8 of 90
building tree 9 of 90
building tree 10 of 90
building tree 11 of 90
building tree 12 of 90
building tree 13 of 90
building tree 14 of 90
building tree 15 of 90
building tree 16 of 90
building tree 17 of 90
building tree 18 of 90
building tree 19 of 90
building tree 20 of 90
building tree 21 of 90
building tree 22 of 90
building tree 23 of 90
building tree 24 of 90
building tree 25 of 90
building tree 26 of 90
building tree 27 of 90
```

```
building tree 28 of 90
building tree 29 of 90
building tree 30 of 90
building tree 31 of 90
building tree 32 of 90
building tree 33 of 90
building tree 34 of 90
building tree 35 of 90
building tree 36 of 90
building tree 37 of 90
building tree 38 of 90
building tree 39 of 90
building tree 40 of 90
building tree 41 of 90
building tree 42 of 90
building tree 43 of 90
building tree 44 of 90
building tree 45 of 90
building tree 46 of 90
building tree 47 of 90
building tree 48 of 90
building tree 49 of 90
building tree 50 of 90
building tree 51 of 90
building tree 52 of 90
building tree 53 of 90
building tree 54 of 90
building tree 55 of 90
building tree 56 of 90
building tree 57 of 90
building tree 58 of 90
building tree 59 of 90
building tree 60 of 90
building tree 61 of 90
building tree 62 of 90
building tree 63 of 90
building tree 64 of 90
building tree 65 of 90
building tree 66 of 90
building tree 67 of 90
building tree 68 of 90
building tree 69 of 90
building tree 70 of 90
building tree 71 of 90
building tree 72 of 90
building tree 73 of 90
building tree 74 of 90
building tree 75 of 90
building tree 76 of 90
building tree 77 of 90
```

```
building tree 78 of 90
building tree 79 of 90
building tree 80 of 90
building tree 81 of 90

[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished

building tree 82 of 90
building tree 83 of 90
building tree 84 of 90
building tree 85 of 90
building tree 86 of 90
building tree 87 of 90
building tree 88 of 90
building tree 89 of 90
building tree 90 of 90
building tree 1 of 90
building tree 2 of 90
building tree 3 of 90
building tree 4 of 90
building tree 5 of 90
building tree 6 of 90
building tree 7 of 90
building tree 8 of 90
building tree 9 of 90
building tree 10 of 90
building tree 11 of 90
building tree 12 of 90
building tree 13 of 90
building tree 14 of 90
building tree 15 of 90
building tree 16 of 90
building tree 17 of 90
building tree 18 of 90
building tree 19 of 90
building tree 20 of 90
building tree 21 of 90
building tree 22 of 90
building tree 23 of 90
building tree 24 of 90
building tree 25 of 90
```

```
building tree 26 of 90
building tree 27 of 90
building tree 28 of 90
building tree 29 of 90
building tree 30 of 90
building tree 31 of 90
building tree 32 of 90
building tree 33 of 90
building tree 34 of 90
building tree 35 of 90
building tree 36 of 90
building tree 37 of 90
building tree 38 of 90
building tree 39 of 90
building tree 40 of 90
building tree 41 of 90
building tree 42 of 90
building tree 43 of 90
building tree 44 of 90
building tree 45 of 90
building tree 46 of 90
building tree 47 of 90
building tree 48 of 90
building tree 49 of 90
building tree 50 of 90
building tree 51 of 90
building tree 52 of 90
building tree 53 of 90
building tree 54 of 90
building tree 55 of 90
building tree 56 of 90
building tree 57 of 90
building tree 58 of 90
building tree 59 of 90
building tree 60 of 90
building tree 61 of 90
building tree 62 of 90
building tree 63 of 90
building tree 64 of 90
building tree 65 of 90
building tree 66 of 90
building tree 67 of 90
building tree 68 of 90
building tree 69 of 90
building tree 70 of 90
building tree 71 of 90
building tree 72 of 90
building tree 73 of 90
building tree 74 of 90
building tree 75 of 90
```

```
building tree 76 of 90
building tree 77 of 90
building tree 78 of 90
building tree 79 of 90
building tree 80 of 90
building tree 81 of 90
building tree 82 of 90
building tree 83 of 90
building tree 84 of 90
building tree 85 of 90
building tree 86 of 90
building tree 87 of 90
building tree 88 of 90
building tree 89 of 90
building tree 90 of 90

[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s

building tree 1 of 90
building tree 2 of 90
building tree 3 of 90
building tree 4 of 90
building tree 5 of 90
building tree 6 of 90
building tree 7 of 90
building tree 8 of 90
building tree 9 of 90
building tree 10 of 90
building tree 11 of 90
building tree 12 of 90
building tree 13 of 90
building tree 14 of 90
building tree 15 of 90
building tree 16 of 90
building tree 17 of 90
building tree 18 of 90
building tree 19 of 90
building tree 20 of 90
```

```
building tree 21 of 90
building tree 22 of 90
building tree 23 of 90
building tree 24 of 90
building tree 25 of 90
building tree 26 of 90
building tree 27 of 90
building tree 28 of 90
building tree 29 of 90
building tree 30 of 90
building tree 31 of 90
building tree 32 of 90
building tree 33 of 90
building tree 34 of 90
building tree 35 of 90
building tree 36 of 90
building tree 37 of 90
building tree 38 of 90
building tree 39 of 90
building tree 40 of 90
building tree 41 of 90
building tree 42 of 90
building tree 43 of 90
building tree 44 of 90
building tree 45 of 90
building tree 46 of 90
building tree 47 of 90
building tree 48 of 90
building tree 49 of 90
building tree 50 of 90
building tree 51 of 90
building tree 52 of 90
building tree 53 of 90
building tree 54 of 90
building tree 55 of 90
building tree 56 of 90
building tree 57 of 90
building tree 58 of 90
building tree 59 of 90
building tree 60 of 90
building tree 61 of 90
building tree 62 of 90
building tree 63 of 90
building tree 64 of 90
building tree 65 of 90
building tree 66 of 90
building tree 67 of 90
building tree 68 of 90
building tree 69 of 90
building tree 70 of 90
```

```
building tree 71 of 90
building tree 72 of 90
building tree 73 of 90
building tree 74 of 90
building tree 75 of 90
building tree 76 of 90
building tree 77 of 90
building tree 78 of 90
building tree 79 of 90
building tree 80 of 90
building tree 81 of 90
building tree 82 of 90
building tree 83 of 90
building tree 84 of 90
building tree 85 of 90
building tree 86 of 90
building tree 87 of 90
building tree 88 of 90
building tree 89 of 90
building tree 90 of 90
building tree 1 of 90
building tree 2 of 90
building tree 3 of 90
building tree 4 of 90
building tree 5 of 90
building tree 6 of 90
building tree 7 of 90
building tree 8 of 90
building tree 9 of 90
building tree 10 of 90
building tree 11 of 90
building tree 12 of 90
building tree 13 of 90
building tree 14 of 90
building tree 15 of 90
building tree 16 of 90
building tree 17 of 90
building tree 18 of 90
building tree 19 of 90
building tree 20 of 90
building tree 21 of 90
building tree 22 of 90
building tree 23 of 90
building tree 24 of 90
building tree 25 of 90
building tree 26 of 90
building tree 27 of 90
building tree 28 of 90
building tree 29 of 90
building tree 30 of 90
```

```
building tree 31 of 90
building tree 32 of 90
building tree 33 of 90
building tree 34 of 90
building tree 35 of 90
building tree 36 of 90
building tree 37 of 90
building tree 38 of 90
building tree 39 of 90
building tree 40 of 90
building tree 41 of 90
building tree 42 of 90
building tree 43 of 90
building tree 44 of 90
building tree 45 of 90
building tree 46 of 90
building tree 47 of 90
building tree 48 of 90
building tree 49 of 90
building tree 50 of 90
building tree 51 of 90
building tree 52 of 90
building tree 53 of 90
building tree 54 of 90
building tree 55 of 90
building tree 56 of 90
building tree 57 of 90
building tree 58 of 90
building tree 59 of 90
building tree 60 of 90
building tree 61 of 90
building tree 62 of 90
building tree 63 of 90
building tree 64 of 90
building tree 65 of 90
building tree 66 of 90
building tree 67 of 90
building tree 68 of 90
building tree 69 of 90
building tree 70 of 90
building tree 71 of 90
building tree 72 of 90
building tree 73 of 90
building tree 74 of 90
building tree 75 of 90
building tree 76 of 90
building tree 77 of 90
building tree 78 of 90
building tree 79 of 90
building tree 80 of 90
```

```
building tree 81 of 90
building tree 82 of 90
building tree 83 of 90
building tree 84 of 90
building tree 85 of 90
building tree 86 of 90
building tree 87 of 90
building tree 88 of 90
building tree 89 of 90
building tree 90 of 90

[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished

building tree 1 of 90
building tree 2 of 90
building tree 3 of 90
building tree 4 of 90
building tree 5 of 90
building tree 6 of 90
building tree 7 of 90
building tree 8 of 90
building tree 9 of 90
building tree 10 of 90
building tree 11 of 90
building tree 12 of 90
building tree 13 of 90
building tree 14 of 90
building tree 15 of 90
building tree 16 of 90
building tree 17 of 90
building tree 18 of 90
building tree 19 of 90
building tree 20 of 90
building tree 21 of 90
building tree 22 of 90
building tree 23 of 90
```

```
building tree 24 of 90
building tree 25 of 90
building tree 26 of 90
building tree 27 of 90
building tree 28 of 90
building tree 29 of 90
building tree 30 of 90
building tree 31 of 90
building tree 32 of 90
building tree 33 of 90
building tree 34 of 90
building tree 35 of 90
building tree 36 of 90
building tree 37 of 90
building tree 38 of 90
building tree 39 of 90
building tree 40 of 90
building tree 41 of 90
building tree 42 of 90
building tree 43 of 90
building tree 44 of 90
building tree 45 of 90
building tree 46 of 90
building tree 47 of 90
building tree 48 of 90
building tree 49 of 90
building tree 50 of 90
building tree 51 of 90
building tree 52 of 90
building tree 53 of 90
building tree 54 of 90
building tree 55 of 90
building tree 56 of 90
building tree 57 of 90
building tree 58 of 90
building tree 59 of 90
building tree 60 of 90
building tree 61 of 90
building tree 62 of 90
building tree 63 of 90
building tree 64 of 90
building tree 65 of 90
building tree 66 of 90
building tree 67 of 90
building tree 68 of 90
building tree 69 of 90
building tree 70 of 90
building tree 71 of 90
building tree 72 of 90
building tree 73 of 90
```

```
building tree 74 of 90
building tree 75 of 90
building tree 76 of 90
building tree 77 of 90
building tree 78 of 90
building tree 79 of 90

[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s

building tree 80 of 90
building tree 81 of 90
building tree 82 of 90
building tree 83 of 90
building tree 84 of 90
building tree 85 of 90
building tree 86 of 90
building tree 87 of 90
building tree 88 of 90
building tree 89 of 90
building tree 90 of 90
building tree 1 of 90
building tree 2 of 90
building tree 3 of 90
building tree 4 of 90
building tree 5 of 90
building tree 6 of 90
building tree 7 of 90
building tree 8 of 90
building tree 9 of 90
building tree 10 of 90
building tree 11 of 90
building tree 12 of 90
building tree 13 of 90
building tree 14 of 90
building tree 15 of 90
building tree 16 of 90
building tree 17 of 90
building tree 18 of 90
```

```
building tree 19 of 90
building tree 20 of 90
building tree 21 of 90
building tree 22 of 90
building tree 23 of 90
building tree 24 of 90
building tree 25 of 90
building tree 26 of 90
building tree 27 of 90
building tree 28 of 90
building tree 29 of 90
building tree 30 of 90
building tree 31 of 90
building tree 32 of 90
building tree 33 of 90
building tree 34 of 90
building tree 35 of 90
building tree 36 of 90
building tree 37 of 90
building tree 38 of 90
building tree 39 of 90
building tree 40 of 90
building tree 41 of 90
building tree 42 of 90
building tree 43 of 90
building tree 44 of 90
building tree 45 of 90
building tree 46 of 90
building tree 47 of 90
building tree 48 of 90
building tree 49 of 90
building tree 50 of 90
building tree 51 of 90
building tree 52 of 90
building tree 53 of 90
building tree 54 of 90
building tree 55 of 90
building tree 56 of 90
building tree 57 of 90
building tree 58 of 90
building tree 59 of 90
building tree 60 of 90
building tree 61 of 90
building tree 62 of 90
building tree 63 of 90
building tree 64 of 90
building tree 65 of 90
building tree 66 of 90
building tree 67 of 90
building tree 68 of 90
```

```
building tree 69 of 90
building tree 70 of 90
building tree 71 of 90
building tree 72 of 90
building tree 73 of 90
building tree 74 of 90
building tree 75 of 90
building tree 76 of 90
building tree 77 of 90
building tree 78 of 90
building tree 79 of 90
building tree 80 of 90
building tree 81 of 90
building tree 82 of 90
building tree 83 of 90
building tree 84 of 90
building tree 85 of 90
building tree 86 of 90
building tree 87 of 90
building tree 88 of 90
building tree 89 of 90
building tree 90 of 90
building tree 1 of 90
building tree 2 of 90
building tree 3 of 90
building tree 4 of 90
building tree 5 of 90
building tree 6 of 90
building tree 7 of 90
building tree 8 of 90
building tree 9 of 90
building tree 10 of 90
building tree 11 of 90
building tree 12 of 90
building tree 13 of 90
building tree 14 of 90
building tree 15 of 90
building tree 16 of 90
building tree 17 of 90
building tree 18 of 90
building tree 19 of 90
building tree 20 of 90
building tree 21 of 90
building tree 22 of 90
building tree 23 of 90
building tree 24 of 90
building tree 25 of 90
building tree 26 of 90
building tree 27 of 90
building tree 28 of 90
```

```
building tree 29 of 90
building tree 30 of 90
building tree 31 of 90
building tree 32 of 90
building tree 33 of 90
building tree 34 of 90
building tree 35 of 90
building tree 36 of 90
building tree 37 of 90
building tree 38 of 90
building tree 39 of 90
building tree 40 of 90
building tree 41 of 90
building tree 42 of 90
building tree 43 of 90
building tree 44 of 90
building tree 45 of 90
building tree 46 of 90
building tree 47 of 90
building tree 48 of 90
building tree 49 of 90
building tree 50 of 90
building tree 51 of 90
building tree 52 of 90
building tree 53 of 90
building tree 54 of 90
building tree 55 of 90
building tree 56 of 90
building tree 57 of 90
building tree 58 of 90
building tree 59 of 90
building tree 60 of 90
building tree 61 of 90
building tree 62 of 90
building tree 63 of 90
building tree 64 of 90
building tree 65 of 90
building tree 66 of 90
building tree 67 of 90
building tree 68 of 90
building tree 69 of 90
building tree 70 of 90
building tree 71 of 90
building tree 72 of 90
building tree 73 of 90
building tree 74 of 90
building tree 75 of 90
building tree 76 of 90
building tree 77 of 90
building tree 78 of 90
```

```
building tree 79 of 90
building tree 80 of 90
building tree 81 of 90
building tree 82 of 90
building tree 83 of 90
building tree 84 of 90
building tree 85 of 90
building tree 86 of 90
building tree 87 of 90
building tree 88 of 90
building tree 89 of 90
building tree 90 of 90

[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished

building tree 1 of 90
building tree 2 of 90
building tree 3 of 90
building tree 4 of 90
building tree 5 of 90
building tree 6 of 90
building tree 7 of 90
building tree 8 of 90
building tree 9 of 90
building tree 10 of 90
building tree 11 of 90
building tree 12 of 90
building tree 13 of 90
building tree 14 of 90
building tree 15 of 90
building tree 16 of 90
building tree 17 of 90
building tree 18 of 90
building tree 19 of 90
building tree 20 of 90
building tree 21 of 90
```

```
building tree 22 of 90
building tree 23 of 90
building tree 24 of 90
building tree 25 of 90
building tree 26 of 90
building tree 27 of 90
building tree 28 of 90
building tree 29 of 90
building tree 30 of 90
building tree 31 of 90
building tree 32 of 90
building tree 33 of 90
building tree 34 of 90
building tree 35 of 90
building tree 36 of 90
building tree 37 of 90
building tree 38 of 90
building tree 39 of 90
building tree 40 of 90
building tree 41 of 90
building tree 42 of 90
building tree 43 of 90
building tree 44 of 90
building tree 45 of 90
building tree 46 of 90
building tree 47 of 90
building tree 48 of 90
building tree 49 of 90
building tree 50 of 90
building tree 51 of 90
building tree 52 of 90
building tree 53 of 90
building tree 54 of 90
building tree 55 of 90
building tree 56 of 90
building tree 57 of 90
building tree 58 of 90
building tree 59 of 90
building tree 60 of 90
building tree 61 of 90
building tree 62 of 90
building tree 63 of 90
building tree 64 of 90
building tree 65 of 90
building tree 66 of 90

[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
```

```
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s

building tree 67 of 90
building tree 68 of 90
building tree 69 of 90
building tree 70 of 90
building tree 71 of 90
building tree 72 of 90
building tree 73 of 90
building tree 74 of 90
building tree 75 of 90
building tree 76 of 90
building tree 77 of 90
building tree 78 of 90
building tree 79 of 90
building tree 80 of 90
building tree 81 of 90
building tree 82 of 90
building tree 83 of 90
building tree 84 of 90
building tree 85 of 90
building tree 86 of 90
building tree 87 of 90
building tree 88 of 90
building tree 89 of 90
building tree 90 of 90
building tree 1 of 74
```

```
building tree 2 of 74
building tree 3 of 74
building tree 4 of 74
building tree 5 of 74
building tree 6 of 74
building tree 7 of 74
building tree 8 of 74
building tree 9 of 74
building tree 10 of 74
building tree 11 of 74
building tree 12 of 74
building tree 13 of 74
building tree 14 of 74
building tree 15 of 74
building tree 16 of 74
building tree 17 of 74
building tree 18 of 74
building tree 19 of 74
building tree 20 of 74
building tree 21 of 74
building tree 22 of 74
building tree 23 of 74
building tree 24 of 74
building tree 25 of 74
building tree 26 of 74
building tree 27 of 74
building tree 28 of 74
building tree 29 of 74
building tree 30 of 74
building tree 31 of 74
building tree 32 of 74
building tree 33 of 74
building tree 34 of 74
building tree 35 of 74
building tree 36 of 74
building tree 37 of 74
building tree 38 of 74
building tree 39 of 74
building tree 40 of 74
building tree 41 of 74
building tree 42 of 74
building tree 43 of 74
building tree 44 of 74
building tree 45 of 74
building tree 46 of 74
building tree 47 of 74
building tree 48 of 74
building tree 49 of 74
building tree 50 of 74
building tree 51 of 74
```

```
building tree 52 of 74
building tree 53 of 74
building tree 54 of 74
building tree 55 of 74
building tree 56 of 74
building tree 57 of 74
building tree 58 of 74
building tree 59 of 74
building tree 60 of 74
building tree 61 of 74
building tree 62 of 74
building tree 63 of 74
building tree 64 of 74
building tree 65 of 74
building tree 66 of 74
building tree 67 of 74
building tree 68 of 74
building tree 69 of 74
building tree 70 of 74
building tree 71 of 74
building tree 72 of 74
building tree 73 of 74
building tree 74 of 74
building tree 1 of 74
building tree 2 of 74
building tree 3 of 74
building tree 4 of 74
building tree 5 of 74
building tree 6 of 74
building tree 7 of 74
building tree 8 of 74
building tree 9 of 74
building tree 10 of 74
building tree 11 of 74
building tree 12 of 74
building tree 13 of 74
building tree 14 of 74
building tree 15 of 74
building tree 16 of 74
building tree 17 of 74
building tree 18 of 74
building tree 19 of 74
building tree 20 of 74
building tree 21 of 74
building tree 22 of 74
building tree 23 of 74
building tree 24 of 74
building tree 25 of 74
building tree 26 of 74
building tree 27 of 74
```

```
building tree 28 of 74
building tree 29 of 74
building tree 30 of 74
building tree 31 of 74
building tree 32 of 74
building tree 33 of 74
building tree 34 of 74
building tree 35 of 74
building tree 36 of 74
building tree 37 of 74
building tree 38 of 74
building tree 39 of 74
building tree 40 of 74
building tree 41 of 74
building tree 42 of 74
building tree 43 of 74
building tree 44 of 74
building tree 45 of 74
building tree 46 of 74
building tree 47 of 74
building tree 48 of 74
building tree 49 of 74
building tree 50 of 74
building tree 51 of 74
building tree 52 of 74
building tree 53 of 74
building tree 54 of 74
building tree 55 of 74
building tree 56 of 74
building tree 57 of 74
building tree 58 of 74
building tree 59 of 74
building tree 60 of 74
building tree 61 of 74
building tree 62 of 74
building tree 63 of 74
building tree 64 of 74
building tree 65 of 74
building tree 66 of 74
building tree 67 of 74
building tree 68 of 74
building tree 69 of 74
building tree 70 of 74
building tree 71 of 74
building tree 72 of 74
building tree 73 of 74
building tree 74 of 74
building tree 1 of 74
```

```
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
```

```
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s

building tree 2 of 74
building tree 3 of 74
building tree 4 of 74
building tree 5 of 74
building tree 6 of 74
building tree 7 of 74
building tree 8 of 74
building tree 9 of 74
building tree 10 of 74
building tree 11 of 74
building tree 12 of 74
building tree 13 of 74
building tree 14 of 74
building tree 15 of 74
building tree 16 of 74
building tree 17 of 74
building tree 18 of 74
building tree 19 of 74
building tree 20 of 74
building tree 21 of 74
building tree 22 of 74
building tree 23 of 74
building tree 24 of 74
```

```
building tree 25 of 74
building tree 26 of 74
building tree 27 of 74
building tree 28 of 74
building tree 29 of 74
building tree 30 of 74
building tree 31 of 74
building tree 32 of 74
building tree 33 of 74
building tree 34 of 74
building tree 35 of 74
building tree 36 of 74
building tree 37 of 74
building tree 38 of 74
building tree 39 of 74
building tree 40 of 74
building tree 41 of 74
building tree 42 of 74
building tree 43 of 74
building tree 44 of 74
building tree 45 of 74
building tree 46 of 74
building tree 47 of 74
building tree 48 of 74
building tree 49 of 74
building tree 50 of 74
building tree 51 of 74
building tree 52 of 74
building tree 53 of 74
building tree 54 of 74
building tree 55 of 74
building tree 56 of 74
building tree 57 of 74
building tree 58 of 74
building tree 59 of 74
building tree 60 of 74
building tree 61 of 74
building tree 62 of 74
building tree 63 of 74
building tree 64 of 74
building tree 65 of 74
building tree 66 of 74
building tree 67 of 74
building tree 68 of 74
building tree 69 of 74
building tree 70 of 74
building tree 71 of 74
building tree 72 of 74
building tree 73 of 74
building tree 74 of 74
```

```
building tree 1 of 74
building tree 2 of 74
building tree 3 of 74
building tree 4 of 74
building tree 5 of 74
building tree 6 of 74
building tree 7 of 74
building tree 8 of 74
building tree 9 of 74
building tree 10 of 74
building tree 11 of 74
building tree 12 of 74
building tree 13 of 74
building tree 14 of 74
building tree 15 of 74
building tree 16 of 74
building tree 17 of 74
building tree 18 of 74
building tree 19 of 74
building tree 20 of 74
building tree 21 of 74
building tree 22 of 74
building tree 23 of 74
building tree 24 of 74
building tree 25 of 74
building tree 26 of 74
building tree 27 of 74
building tree 28 of 74
building tree 29 of 74
building tree 30 of 74
building tree 31 of 74
building tree 32 of 74
building tree 33 of 74
building tree 34 of 74
building tree 35 of 74
building tree 36 of 74
building tree 37 of 74
building tree 38 of 74
building tree 39 of 74
building tree 40 of 74
building tree 41 of 74
building tree 42 of 74
building tree 43 of 74
building tree 44 of 74
building tree 45 of 74
building tree 46 of 74
building tree 47 of 74
building tree 48 of 74
building tree 49 of 74
building tree 50 of 74
```

```
building tree 51 of 74
building tree 52 of 74
building tree 53 of 74
building tree 54 of 74
building tree 55 of 74
building tree 56 of 74
building tree 57 of 74
building tree 58 of 74
building tree 59 of 74
building tree 60 of 74
building tree 61 of 74
building tree 62 of 74
building tree 63 of 74
building tree 64 of 74
building tree 65 of 74
building tree 66 of 74
building tree 67 of 74
building tree 68 of 74
building tree 69 of 74
building tree 70 of 74
building tree 71 of 74
building tree 72 of 74
building tree 73 of 74
building tree 74 of 74
building tree 1 of 74
building tree 2 of 74
building tree 3 of 74
building tree 4 of 74
building tree 5 of 74
building tree 6 of 74
building tree 7 of 74
building tree 8 of 74
building tree 9 of 74
building tree 10 of 74

[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
```

```
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
```

```
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s

building tree 11 of 74
building tree 12 of 74
building tree 13 of 74
building tree 14 of 74
building tree 15 of 74
building tree 16 of 74
building tree 17 of 74
building tree 18 of 74
building tree 19 of 74
building tree 20 of 74
building tree 21 of 74
building tree 22 of 74
building tree 23 of 74
building tree 24 of 74
building tree 25 of 74
building tree 26 of 74
building tree 27 of 74
building tree 28 of 74
building tree 29 of 74
building tree 30 of 74
building tree 31 of 74
building tree 32 of 74
building tree 33 of 74
building tree 34 of 74
building tree 35 of 74
building tree 36 of 74
building tree 37 of 74
building tree 38 of 74
building tree 39 of 74
building tree 40 of 74
building tree 41 of 74
building tree 42 of 74
building tree 43 of 74
building tree 44 of 74
building tree 45 of 74
building tree 46 of 74
building tree 47 of 74
building tree 48 of 74
```

```
building tree 49 of 74
building tree 50 of 74
building tree 51 of 74
building tree 52 of 74
building tree 53 of 74
building tree 54 of 74
building tree 55 of 74
building tree 56 of 74
building tree 57 of 74
building tree 58 of 74
building tree 59 of 74
building tree 60 of 74
building tree 61 of 74
building tree 62 of 74
building tree 63 of 74
building tree 64 of 74
building tree 65 of 74
building tree 66 of 74
building tree 67 of 74
building tree 68 of 74
building tree 69 of 74
building tree 70 of 74
building tree 71 of 74
building tree 72 of 74
building tree 73 of 74
building tree 74 of 74
building tree 1 of 74
building tree 2 of 74
building tree 3 of 74
building tree 4 of 74
building tree 5 of 74
building tree 6 of 74
building tree 7 of 74
building tree 8 of 74
building tree 9 of 74
building tree 10 of 74
building tree 11 of 74
building tree 12 of 74
building tree 13 of 74
building tree 14 of 74
building tree 15 of 74
building tree 16 of 74
building tree 17 of 74
building tree 18 of 74
building tree 19 of 74
building tree 20 of 74
building tree 21 of 74
building tree 22 of 74
building tree 23 of 74
building tree 24 of 74
```

```
building tree 25 of 74
building tree 26 of 74
building tree 27 of 74
building tree 28 of 74
building tree 29 of 74
building tree 30 of 74
building tree 31 of 74
building tree 32 of 74
building tree 33 of 74
building tree 34 of 74
building tree 35 of 74
building tree 36 of 74
building tree 37 of 74
building tree 38 of 74
building tree 39 of 74
building tree 40 of 74
building tree 41 of 74
building tree 42 of 74
building tree 43 of 74
building tree 44 of 74
building tree 45 of 74
building tree 46 of 74
building tree 47 of 74
building tree 48 of 74
building tree 49 of 74
building tree 50 of 74
building tree 51 of 74
building tree 52 of 74
building tree 53 of 74
building tree 54 of 74
building tree 55 of 74
building tree 56 of 74
building tree 57 of 74
building tree 58 of 74
building tree 59 of 74
building tree 60 of 74
building tree 61 of 74
building tree 62 of 74

[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
```

```
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
```

```
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s

building tree 63 of 74
building tree 64 of 74
building tree 65 of 74
building tree 66 of 74
building tree 67 of 74
building tree 68 of 74
building tree 69 of 74
building tree 70 of 74
building tree 71 of 74
building tree 72 of 74
building tree 73 of 74
building tree 74 of 74
building tree 1 of 74
building tree 2 of 74
building tree 3 of 74
building tree 4 of 74
building tree 5 of 74
building tree 6 of 74
building tree 7 of 74
building tree 8 of 74
building tree 9 of 74
building tree 10 of 74
building tree 11 of 74
building tree 12 of 74
building tree 13 of 74
building tree 14 of 74
building tree 15 of 74
building tree 16 of 74
building tree 17 of 74
building tree 18 of 74
building tree 19 of 74
building tree 20 of 74
building tree 21 of 74
building tree 22 of 74
```

```
building tree 23 of 74
building tree 24 of 74
building tree 25 of 74
building tree 26 of 74
building tree 27 of 74
building tree 28 of 74
building tree 29 of 74
building tree 30 of 74
building tree 31 of 74
building tree 32 of 74
building tree 33 of 74
building tree 34 of 74
building tree 35 of 74
building tree 36 of 74
building tree 37 of 74
building tree 38 of 74
building tree 39 of 74
building tree 40 of 74
building tree 41 of 74
building tree 42 of 74
building tree 43 of 74
building tree 44 of 74
building tree 45 of 74
building tree 46 of 74
building tree 47 of 74
building tree 48 of 74
building tree 49 of 74
building tree 50 of 74
building tree 51 of 74
building tree 52 of 74
building tree 53 of 74
building tree 54 of 74
building tree 55 of 74
building tree 56 of 74
building tree 57 of 74
building tree 58 of 74
building tree 59 of 74
building tree 60 of 74
building tree 61 of 74
building tree 62 of 74
building tree 63 of 74
building tree 64 of 74
building tree 65 of 74
building tree 66 of 74
building tree 67 of 74
building tree 68 of 74
building tree 69 of 74
building tree 70 of 74
building tree 71 of 74
building tree 72 of 74
```

```
building tree 73 of 74
building tree 74 of 74
building tree 1 of 74
building tree 2 of 74
building tree 3 of 74
building tree 4 of 74
building tree 5 of 74
building tree 6 of 74
building tree 7 of 74
building tree 8 of 74
building tree 9 of 74
building tree 10 of 74
building tree 11 of 74
building tree 12 of 74
building tree 13 of 74
building tree 14 of 74
building tree 15 of 74
building tree 16 of 74
building tree 17 of 74
building tree 18 of 74
building tree 19 of 74
building tree 20 of 74
building tree 21 of 74
building tree 22 of 74
building tree 23 of 74
building tree 24 of 74
building tree 25 of 74
building tree 26 of 74
building tree 27 of 74
building tree 28 of 74
building tree 29 of 74
building tree 30 of 74
building tree 31 of 74
building tree 32 of 74
building tree 33 of 74
building tree 34 of 74
building tree 35 of 74
building tree 36 of 74
building tree 37 of 74
building tree 38 of 74
building tree 39 of 74
building tree 40 of 74
building tree 41 of 74
building tree 42 of 74
building tree 43 of 74
building tree 44 of 74
building tree 45 of 74
building tree 46 of 74
building tree 47 of 74
building tree 48 of 74
```

```
building tree 49 of 74
building tree 50 of 74
building tree 51 of 74
building tree 52 of 74
building tree 53 of 74
building tree 54 of 74
building tree 55 of 74
building tree 56 of 74
building tree 57 of 74
building tree 58 of 74
building tree 59 of 74
building tree 60 of 74
building tree 61 of 74
building tree 62 of 74
building tree 63 of 74
building tree 64 of 74
building tree 65 of 74
building tree 66 of 74
building tree 67 of 74
building tree 68 of 74
building tree 69 of 74
building tree 70 of 74
building tree 71 of 74
building tree 72 of 74
building tree 73 of 74
building tree 74 of 74
building tree 1 of 74
building tree 2 of 74
building tree 3 of 74
building tree 4 of 74
building tree 5 of 74
building tree 6 of 74
building tree 7 of 74
building tree 8 of 74
building tree 9 of 74
building tree 10 of 74
building tree 11 of 74
building tree 12 of 74
building tree 13 of 74
building tree 14 of 74

[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
```

```
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
```

```
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s

building tree 15 of 74
building tree 16 of 74
building tree 17 of 74
building tree 18 of 74
building tree 19 of 74
building tree 20 of 74
building tree 21 of 74
building tree 22 of 74
building tree 23 of 74
building tree 24 of 74
building tree 25 of 74
building tree 26 of 74
building tree 27 of 74
building tree 28 of 74
building tree 29 of 74
building tree 30 of 74
building tree 31 of 74
building tree 32 of 74
building tree 33 of 74
building tree 34 of 74
building tree 35 of 74
building tree 36 of 74
building tree 37 of 74
building tree 38 of 74
building tree 39 of 74
building tree 40 of 74
building tree 41 of 74
building tree 42 of 74
building tree 43 of 74
building tree 44 of 74
building tree 45 of 74
building tree 46 of 74
```

```
building tree 47 of 74
building tree 48 of 74
building tree 49 of 74
building tree 50 of 74
building tree 51 of 74
building tree 52 of 74
building tree 53 of 74
building tree 54 of 74
building tree 55 of 74
building tree 56 of 74
building tree 57 of 74
building tree 58 of 74
building tree 59 of 74
building tree 60 of 74
building tree 61 of 74
building tree 62 of 74
building tree 63 of 74
building tree 64 of 74
building tree 65 of 74
building tree 66 of 74
building tree 67 of 74
building tree 68 of 74
building tree 69 of 74
building tree 70 of 74
building tree 71 of 74
building tree 72 of 74
building tree 73 of 74
building tree 74 of 74
building tree 1 of 74
building tree 2 of 74
building tree 3 of 74
building tree 4 of 74
building tree 5 of 74
building tree 6 of 74
building tree 7 of 74
building tree 8 of 74
building tree 9 of 74
building tree 10 of 74
building tree 11 of 74
building tree 12 of 74
building tree 13 of 74
building tree 14 of 74
building tree 15 of 74
building tree 16 of 74
building tree 17 of 74
building tree 18 of 74
building tree 19 of 74
building tree 20 of 74
building tree 21 of 74
building tree 22 of 74
```

```
building tree 23 of 74
building tree 24 of 74
building tree 25 of 74
building tree 26 of 74
building tree 27 of 74
building tree 28 of 74
building tree 29 of 74
building tree 30 of 74
building tree 31 of 74
building tree 32 of 74
building tree 33 of 74
building tree 34 of 74
building tree 35 of 74
building tree 36 of 74
building tree 37 of 74
building tree 38 of 74
building tree 39 of 74
building tree 40 of 74
building tree 41 of 74
building tree 42 of 74
building tree 43 of 74
building tree 44 of 74
building tree 45 of 74
building tree 46 of 74
building tree 47 of 74
building tree 48 of 74
building tree 49 of 74
building tree 50 of 74
building tree 51 of 74
building tree 52 of 74
building tree 53 of 74
building tree 54 of 74
building tree 55 of 74
building tree 56 of 74
building tree 57 of 74
building tree 58 of 74
building tree 59 of 74
building tree 60 of 74
building tree 61 of 74
building tree 62 of 74
building tree 63 of 74
building tree 64 of 74
building tree 65 of 74
building tree 66 of 74
building tree 67 of 74
building tree 68 of 74
building tree 69 of 74
building tree 70 of 74
building tree 71 of 74
building tree 72 of 74
```

```
building tree 73 of 74
building tree 74 of 74
building tree 1 of 55
building tree 2 of 55
building tree 3 of 55
building tree 4 of 55
building tree 5 of 55
building tree 6 of 55
building tree 7 of 55

[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
```

```
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  74 out of  74 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
```

```
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished

building tree 8 of 55
building tree 9 of 55
building tree 10 of 55
building tree 11 of 55
building tree 12 of 55
building tree 13 of 55
building tree 14 of 55
building tree 15 of 55
building tree 16 of 55
building tree 17 of 55
building tree 18 of 55
building tree 19 of 55
building tree 20 of 55
building tree 21 of 55
building tree 22 of 55
building tree 23 of 55
building tree 24 of 55
building tree 25 of 55
building tree 26 of 55
building tree 27 of 55
building tree 28 of 55
building tree 29 of 55
building tree 30 of 55
building tree 31 of 55
building tree 32 of 55
building tree 33 of 55
building tree 34 of 55
building tree 35 of 55
building tree 36 of 55
building tree 37 of 55
building tree 38 of 55
building tree 39 of 55
building tree 40 of 55
building tree 41 of 55
building tree 42 of 55
building tree 43 of 55
building tree 44 of 55
building tree 45 of 55
building tree 46 of 55
building tree 47 of 55
building tree 48 of 55
building tree 49 of 55
building tree 50 of 55
```

```
building tree 51 of 55
building tree 52 of 55
building tree 53 of 55
building tree 54 of 55
building tree 55 of 55
building tree 1 of 55
building tree 2 of 55
building tree 3 of 55
building tree 4 of 55
building tree 5 of 55
building tree 6 of 55
building tree 7 of 55
building tree 8 of 55
building tree 9 of 55
building tree 10 of 55
building tree 11 of 55
building tree 12 of 55
building tree 13 of 55
building tree 14 of 55
building tree 15 of 55
building tree 16 of 55
building tree 17 of 55
building tree 18 of 55
building tree 19 of 55
building tree 20 of 55
building tree 21 of 55
building tree 22 of 55
building tree 23 of 55
building tree 24 of 55
building tree 25 of 55
building tree 26 of 55
building tree 27 of 55
building tree 28 of 55
building tree 29 of 55
building tree 30 of 55
building tree 31 of 55
building tree 32 of 55
building tree 33 of 55
building tree 34 of 55
building tree 35 of 55
building tree 36 of 55
building tree 37 of 55
building tree 38 of 55
building tree 39 of 55
building tree 40 of 55
building tree 41 of 55
building tree 42 of 55
building tree 43 of 55
building tree 44 of 55
building tree 45 of 55
```

```
building tree 46 of 55
building tree 47 of 55
building tree 48 of 55
building tree 49 of 55
building tree 50 of 55
building tree 51 of 55
building tree 52 of 55
building tree 53 of 55
building tree 54 of 55
building tree 55 of 55
building tree 1 of 55
building tree 2 of 55
building tree 3 of 55
building tree 4 of 55
building tree 5 of 55
building tree 6 of 55
building tree 7 of 55
building tree 8 of 55
building tree 9 of 55
building tree 10 of 55
building tree 11 of 55
building tree 12 of 55
building tree 13 of 55
building tree 14 of 55
building tree 15 of 55
building tree 16 of 55
building tree 17 of 55
building tree 18 of 55
building tree 19 of 55
building tree 20 of 55
building tree 21 of 55
building tree 22 of 55
building tree 23 of 55
building tree 24 of 55
building tree 25 of 55
building tree 26 of 55
building tree 27 of 55
building tree 28 of 55
building tree 29 of 55
building tree 30 of 55
building tree 31 of 55
building tree 32 of 55
building tree 33 of 55
building tree 34 of 55
building tree 35 of 55
building tree 36 of 55
building tree 37 of 55
building tree 38 of 55
building tree 39 of 55
building tree 40 of 55
```

```
building tree 41 of 55
building tree 42 of 55
building tree 43 of 55
building tree 44 of 55
building tree 45 of 55
building tree 46 of 55
building tree 47 of 55
building tree 48 of 55
building tree 49 of 55
building tree 50 of 55
building tree 51 of 55
building tree 52 of 55
building tree 53 of 55
building tree 54 of 55
building tree 55 of 55

[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
```

```
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
```

```
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished

building tree 1 of 55
building tree 2 of 55
building tree 3 of 55
building tree 4 of 55
building tree 5 of 55
building tree 6 of 55
building tree 7 of 55
building tree 8 of 55
building tree 9 of 55
building tree 10 of 55
building tree 11 of 55
building tree 12 of 55
building tree 13 of 55
building tree 14 of 55
building tree 15 of 55
building tree 16 of 55
building tree 17 of 55
building tree 18 of 55
building tree 19 of 55
```

```
building tree 20 of 55
building tree 21 of 55
building tree 22 of 55
building tree 23 of 55
building tree 24 of 55
building tree 25 of 55
building tree 26 of 55
building tree 27 of 55
building tree 28 of 55
building tree 29 of 55
building tree 30 of 55
building tree 31 of 55
building tree 32 of 55
building tree 33 of 55
building tree 34 of 55
building tree 35 of 55
building tree 36 of 55
building tree 37 of 55
building tree 38 of 55
building tree 39 of 55
building tree 40 of 55
building tree 41 of 55
building tree 42 of 55
building tree 43 of 55
building tree 44 of 55
building tree 45 of 55
building tree 46 of 55
building tree 47 of 55
building tree 48 of 55
building tree 49 of 55
building tree 50 of 55
building tree 51 of 55
building tree 52 of 55
building tree 53 of 55
building tree 54 of 55
building tree 55 of 55
building tree 1 of 55
building tree 2 of 55
building tree 3 of 55
building tree 4 of 55
building tree 5 of 55
building tree 6 of 55
building tree 7 of 55
building tree 8 of 55
building tree 9 of 55
building tree 10 of 55
building tree 11 of 55
building tree 12 of 55
building tree 13 of 55
building tree 14 of 55
```

```
building tree 15 of 55
building tree 16 of 55
building tree 17 of 55
building tree 18 of 55
building tree 19 of 55
building tree 20 of 55
building tree 21 of 55
building tree 22 of 55
building tree 23 of 55
building tree 24 of 55
building tree 25 of 55
building tree 26 of 55
building tree 27 of 55
building tree 28 of 55
building tree 29 of 55
building tree 30 of 55
building tree 31 of 55
building tree 32 of 55
building tree 33 of 55
building tree 34 of 55
building tree 35 of 55
building tree 36 of 55
building tree 37 of 55
building tree 38 of 55
building tree 39 of 55
building tree 40 of 55
building tree 41 of 55
building tree 42 of 55
building tree 43 of 55
building tree 44 of 55
building tree 45 of 55
building tree 46 of 55
building tree 47 of 55
building tree 48 of 55
building tree 49 of 55
building tree 50 of 55
building tree 51 of 55
building tree 52 of 55
building tree 53 of 55
building tree 54 of 55
building tree 55 of 55
building tree 1 of 55
building tree 2 of 55
building tree 3 of 55
building tree 4 of 55
building tree 5 of 55
building tree 6 of 55
building tree 7 of 55
building tree 8 of 55
building tree 9 of 55
```

```
building tree 10 of 55
building tree 11 of 55
building tree 12 of 55
building tree 13 of 55
building tree 14 of 55
building tree 15 of 55
building tree 16 of 55
building tree 17 of 55
building tree 18 of 55
building tree 19 of 55
building tree 20 of 55
building tree 21 of 55
building tree 22 of 55
building tree 23 of 55
building tree 24 of 55
building tree 25 of 55
building tree 26 of 55
building tree 27 of 55
building tree 28 of 55
building tree 29 of 55
building tree 30 of 55
building tree 31 of 55
building tree 32 of 55
building tree 33 of 55
building tree 34 of 55
building tree 35 of 55
building tree 36 of 55
building tree 37 of 55
building tree 38 of 55
building tree 39 of 55
building tree 40 of 55
building tree 41 of 55
building tree 42 of 55
building tree 43 of 55
building tree 44 of 55
building tree 45 of 55
building tree 46 of 55
building tree 47 of 55
building tree 48 of 55
building tree 49 of 55
building tree 50 of 55
building tree 51 of 55
building tree 52 of 55
building tree 53 of 55
building tree 54 of 55
building tree 55 of 55
building tree 1 of 55
building tree 2 of 55
```

```
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
```

```
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
```

```
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.

building tree 3 of 55
building tree 4 of 55
building tree 5 of 55
building tree 6 of 55
building tree 7 of 55
building tree 8 of 55
building tree 9 of 55
building tree 10 of 55
building tree 11 of 55
building tree 12 of 55
building tree 13 of 55
building tree 14 of 55
building tree 15 of 55
building tree 16 of 55
building tree 17 of 55
building tree 18 of 55
building tree 19 of 55
building tree 20 of 55
building tree 21 of 55
building tree 22 of 55
building tree 23 of 55
building tree 24 of 55
building tree 25 of 55
building tree 26 of 55
building tree 27 of 55
building tree 28 of 55
building tree 29 of 55
building tree 30 of 55
building tree 31 of 55
building tree 32 of 55
building tree 33 of 55
building tree 34 of 55
building tree 35 of 55
```

```
building tree 36 of 55
building tree 37 of 55
building tree 38 of 55
building tree 39 of 55
building tree 40 of 55
building tree 41 of 55
building tree 42 of 55
building tree 43 of 55
building tree 44 of 55
building tree 45 of 55
building tree 46 of 55
building tree 47 of 55
building tree 48 of 55
building tree 49 of 55
building tree 50 of 55
building tree 51 of 55
building tree 52 of 55
building tree 53 of 55
building tree 54 of 55
building tree 55 of 55
building tree 1 of 55
building tree 2 of 55
building tree 3 of 55
building tree 4 of 55
building tree 5 of 55
building tree 6 of 55
building tree 7 of 55
building tree 8 of 55
building tree 9 of 55
building tree 10 of 55
building tree 11 of 55
building tree 12 of 55
building tree 13 of 55
building tree 14 of 55
building tree 15 of 55
building tree 16 of 55
building tree 17 of 55
building tree 18 of 55
building tree 19 of 55
building tree 20 of 55
building tree 21 of 55
building tree 22 of 55
building tree 23 of 55
building tree 24 of 55
building tree 25 of 55
building tree 26 of 55
building tree 27 of 55
building tree 28 of 55
building tree 29 of 55
building tree 30 of 55
```

```
building tree 31 of 55
building tree 32 of 55
building tree 33 of 55
building tree 34 of 55
building tree 35 of 55
building tree 36 of 55
building tree 37 of 55
building tree 38 of 55
building tree 39 of 55
building tree 40 of 55
building tree 41 of 55
building tree 42 of 55
building tree 43 of 55
building tree 44 of 55
building tree 45 of 55
building tree 46 of 55
building tree 47 of 55
building tree 48 of 55
building tree 49 of 55
building tree 50 of 55
building tree 51 of 55
building tree 52 of 55
building tree 53 of 55
building tree 54 of 55
building tree 55 of 55
building tree 1 of 55
building tree 2 of 55
building tree 3 of 55
building tree 4 of 55
building tree 5 of 55
building tree 6 of 55
building tree 7 of 55
building tree 8 of 55
building tree 9 of 55
building tree 10 of 55
building tree 11 of 55
building tree 12 of 55
building tree 13 of 55
building tree 14 of 55
building tree 15 of 55
building tree 16 of 55
building tree 17 of 55
building tree 18 of 55
building tree 19 of 55
building tree 20 of 55
building tree 21 of 55
building tree 22 of 55
building tree 23 of 55
building tree 24 of 55
building tree 25 of 55
```

```
building tree 26 of 55
building tree 27 of 55
building tree 28 of 55
building tree 29 of 55
building tree 30 of 55
building tree 31 of 55
building tree 32 of 55
building tree 33 of 55
building tree 34 of 55
building tree 35 of 55
building tree 36 of 55
building tree 37 of 55
building tree 38 of 55
building tree 39 of 55
building tree 40 of 55
building tree 41 of 55
building tree 42 of 55
building tree 43 of 55
building tree 44 of 55
building tree 45 of 55
building tree 46 of 55
building tree 47 of 55
building tree 48 of 55
building tree 49 of 55
building tree 50 of 55
building tree 51 of 55
building tree 52 of 55
building tree 53 of 55
building tree 54 of 55
building tree 55 of 55
building tree 1 of 55
building tree 2 of 55
building tree 3 of 55
building tree 4 of 55
building tree 5 of 55
building tree 6 of 55
building tree 7 of 55
building tree 8 of 55
building tree 9 of 55
building tree 10 of 55
building tree 11 of 55
building tree 12 of 55
building tree 13 of 55
building tree 14 of 55
building tree 15 of 55
building tree 16 of 55
building tree 17 of 55
building tree 18 of 55
building tree 19 of 55
building tree 20 of 55
```

```
building tree 21 of 55
building tree 22 of 55

[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
```

```
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
```

```
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  55 out of  55 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
```

```
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
```

```
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s finished
```

```
building tree 23 of 55
building tree 24 of 55
building tree 25 of 55
building tree 26 of 55
building tree 27 of 55
building tree 28 of 55
building tree 29 of 55
building tree 30 of 55
building tree 31 of 55
building tree 32 of 55
building tree 33 of 55
building tree 34 of 55
building tree 35 of 55
building tree 36 of 55
building tree 37 of 55
building tree 38 of 55
building tree 39 of 55
building tree 40 of 55
building tree 41 of 55
building tree 42 of 55
building tree 43 of 55
building tree 44 of 55
building tree 45 of 55
building tree 46 of 55
building tree 47 of 55
building tree 48 of 55
building tree 49 of 55
building tree 50 of 55
building tree 51 of 55
building tree 52 of 55
building tree 53 of 55
building tree 54 of 55
building tree 55 of 55
building tree 1 of 1
```

```
building tree 1 of 1
building tree 1 of 1
building tree 1 of 1
building tree 1 of 1
building tree 1 of 1
building tree 1 of 1
building tree 1 of 1
building tree 1 of 1
building tree 1 of 1
building tree 1 of 90
building tree 2 of 90
building tree 3 of 90
building tree 4 of 90
building tree 5 of 90
building tree 6 of 90
building tree 7 of 90
building tree 8 of 90
building tree 9 of 90
building tree 10 of 90
building tree 11 of 90
building tree 12 of 90
building tree 13 of 90
building tree 14 of 90
building tree 15 of 90
building tree 16 of 90
building tree 17 of 90
building tree 18 of 90
building tree 19 of 90
building tree 20 of 90
building tree 21 of 90
building tree 22 of 90
building tree 23 of 90
building tree 24 of 90
building tree 25 of 90
building tree 26 of 90
building tree 27 of 90
building tree 28 of 90
building tree 29 of 90
building tree 30 of 90
building tree 31 of 90
building tree 32 of 90
building tree 33 of 90
building tree 34 of 90
building tree 35 of 90
building tree 36 of 90
building tree 37 of 90
building tree 38 of 90
building tree 39 of 90
building tree 40 of 90
building tree 41 of 90
```

```
building tree 42 of 90
building tree 43 of 90
building tree 44 of 90
building tree 45 of 90
building tree 46 of 90
building tree 47 of 90
building tree 48 of 90
building tree 49 of 90
building tree 50 of 90
building tree 51 of 90
building tree 52 of 90
building tree 53 of 90
building tree 54 of 90
building tree 55 of 90
building tree 56 of 90
building tree 57 of 90
building tree 58 of 90
building tree 59 of 90
building tree 60 of 90
building tree 61 of 90
building tree 62 of 90
building tree 63 of 90
building tree 64 of 90
building tree 65 of 90
building tree 66 of 90
building tree 67 of 90
building tree 68 of 90
building tree 69 of 90
building tree 70 of 90
building tree 71 of 90
building tree 72 of 90
building tree 73 of 90
building tree 74 of 90
building tree 75 of 90
building tree 76 of 90
building tree 77 of 90
building tree 78 of 90
building tree 79 of 90
building tree 80 of 90
building tree 81 of 90
building tree 82 of 90
building tree 83 of 90
building tree 84 of 90
building tree 85 of 90
building tree 86 of 90
building tree 87 of 90
building tree 88 of 90
building tree 89 of 90
building tree 90 of 90
```

```
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  90 out of  90 | elapsed:    0.0s finished

RandomizedSearchCV(cv=10, estimator=RandomForestClassifier(),
n_iter=4,
                   param_distributions={'criterion': ['gini',
'entropy'],
                                        'max_depth': [2, 5, 8, 10],
                                        'max_features': ['auto',
'sqrt',
                                                         'log2'],
                                        'n_estimators': [1, 20, 30,
55, 68, 74,
                                                         90, 120,
115],
                                        'verbose': [1, 2, 3, 4, 6, 8,
9, 10]})
```

```
bt_params = RCV.best_params_
bt_score = RCV.best_score_
```

```
bt_params
```

```
{'verbose': 2,
 'n_estimators': 90,
 'max_features': 'sqrt',
 'max_depth': 8,
 'criterion': 'entropy'}
```

```
bt_score
```

```
0.794104609929078
```

```
def RandomForest(X_train,X_test, y_train, y_test):
    model = RandomForestClassifier(verbose= 10 , n_estimators= 68 ,
max_features= 'auto', max_depth= 8 , criterion= 'entropy')
    model.fit(X_train,y_train)
    y_tr = model.predict(X_train)
    print("Training Accuracy")
    print(accuracy_score(y_tr,y_train))
    yPred = model.predict(X_test)
    print("Training Accuracy")
    print(accuracy_score(yPred,y_test))
```

```
model = RandomForestClassifier(verbose= 10 , n_estimators= 68 ,
max_features= 'auto', max_depth= 8 , criterion= 'entropy')
model.fit(X_train,y_train)
```

```
building tree 1 of 68
building tree 2 of 68
building tree 3 of 68
building tree 4 of 68
building tree 5 of 68
building tree 6 of 68
building tree 7 of 68
building tree 8 of 68
building tree 9 of 68
building tree 10 of 68
building tree 11 of 68
building tree 12 of 68
building tree 13 of 68
building tree 14 of 68
building tree 15 of 68
building tree 16 of 68
building tree 17 of 68
building tree 18 of 68
building tree 19 of 68
building tree 20 of 68
building tree 21 of 68
building tree 22 of 68
building tree 23 of 68
building tree 24 of 68
building tree 25 of 68
building tree 26 of 68
building tree 27 of 68
building tree 28 of 68
building tree 29 of 68
building tree 30 of 68
building tree 31 of 68
building tree 32 of 68
building tree 33 of 68
building tree 34 of 68
building tree 35 of 68
building tree 36 of 68
building tree 37 of 68
building tree 38 of 68
building tree 39 of 68
building tree 40 of 68
building tree 41 of 68
building tree 42 of 68
building tree 43 of 68
building tree 44 of 68
building tree 45 of 68
building tree 46 of 68
building tree 47 of 68
building tree 48 of 68
building tree 49 of 68
building tree 50 of 68
```

```
building tree 51 of 68
building tree 52 of 68
building tree 53 of 68
building tree 54 of 68
building tree 55 of 68
building tree 56 of 68
building tree 57 of 68
building tree 58 of 68
building tree 59 of 68
building tree 60 of 68
building tree 61 of 68
building tree 62 of 68
building tree 63 of 68
building tree 64 of 68
building tree 65 of 68
building tree 66 of 68
building tree 67 of 68
building tree 68 of 68

[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   9 out of   9 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  68 out of  68 | elapsed:    0.0s finished

RandomForestClassifier(criterion='entropy', max_depth=8,
n_estimators=68,
                       verbose=10)

RandomForest(X_train,X_test,y_train,y_test)

building tree 1 of 68
building tree 2 of 68
building tree 3 of 68
building tree 4 of 68
```

```
building tree 5 of 68
building tree 6 of 68
building tree 7 of 68
building tree 8 of 68
building tree 9 of 68
building tree 10 of 68
building tree 11 of 68
building tree 12 of 68
building tree 13 of 68
building tree 14 of 68
building tree 15 of 68
building tree 16 of 68
building tree 17 of 68
building tree 18 of 68
building tree 19 of 68
building tree 20 of 68
building tree 21 of 68
building tree 22 of 68
building tree 23 of 68
building tree 24 of 68
building tree 25 of 68
building tree 26 of 68
building tree 27 of 68
building tree 28 of 68
building tree 29 of 68
building tree 30 of 68
building tree 31 of 68
building tree 32 of 68
building tree 33 of 68
building tree 34 of 68
building tree 35 of 68
building tree 36 of 68
building tree 37 of 68
building tree 38 of 68
building tree 39 of 68
building tree 40 of 68
building tree 41 of 68
building tree 42 of 68
building tree 43 of 68
building tree 44 of 68
building tree 45 of 68
building tree 46 of 68
building tree 47 of 68
building tree 48 of 68
building tree 49 of 68
building tree 50 of 68
building tree 51 of 68
building tree 52 of 68
building tree 53 of 68
building tree 54 of 68
```

```
building tree 55 of 68
building tree 56 of 68
building tree 57 of 68
building tree 58 of 68
building tree 59 of 68
building tree 60 of 68
building tree 61 of 68
building tree 62 of 68
building tree 63 of 68
building tree 64 of 68
building tree 65 of 68
building tree 66 of 68
building tree 67 of 68
building tree 68 of 68
Training Accuracy
0.89937106918239
Training Accuracy
0.8127659574468085

[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   9 out of   9 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  68 out of  68 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
```

```
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   9 out of   9 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  68 out of  68 | elapsed:    0.0s finished
[Parallel(n_jobs=1)]: Using backend SequentialBackend with 1
concurrent workers.
[Parallel(n_jobs=1)]: Done   1 out of   1 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   2 out of   2 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   3 out of   3 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   4 out of   4 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   5 out of   5 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   6 out of   6 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   7 out of   7 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   8 out of   8 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done   9 out of   9 | elapsed:    0.0s
remaining:    0.0s
[Parallel(n_jobs=1)]: Done  68 out of  68 | elapsed:    0.0s finished
```

saving the model

```
pickle.dump(model,open('rdf.pk1','wb'))
```

```
pickle.dump(sc,open('scale.pk1','wb'))
```