DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING

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# Experiment - 8

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**Branch:** CSE
**Semester:** 5th
**Subject Name:** Machine Learning Lab

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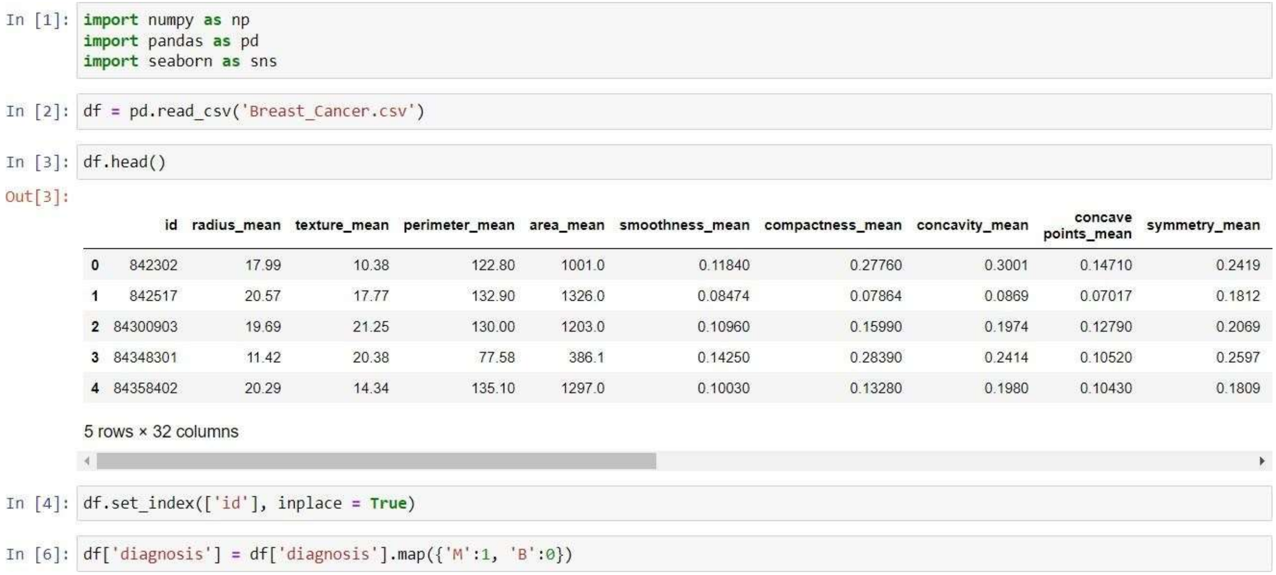
**Section/Group:** 20BCS_WM-703/B
**Date of Performance:** 1/11/2022
**Subject Code:** 20CSP-317

1. **Aim:** Decision Trees and Random Forests — Explained with Python Implementation.

2. **Objective:** To prepare a model with Decision Trees and Random Forests algorithm.

3. **Data Set Chosen:** Breast Cancer Wisconsin (Diagnostic) Data Set

4. **Result and output:**



```
In [1]: import numpy as np
        import pandas as pd
        import seaborn as sns
```

```
In [2]: df = pd.read_csv('Breast_Cancer.csv')
```

```
In [3]: df.head()
```

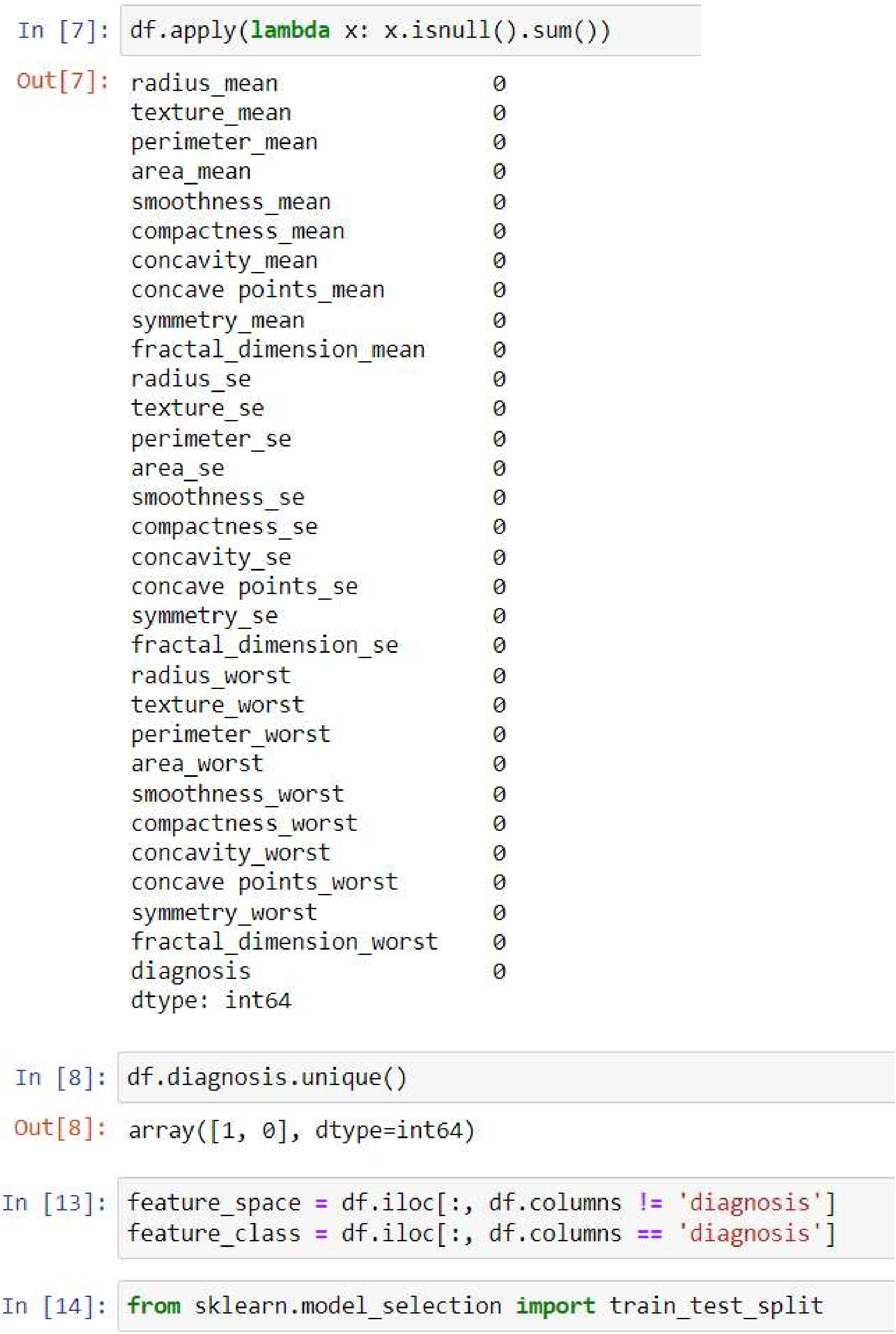
Out[3]:

| | id | radius_mean | texture_mean | perimeter_mean | area_mean | smoothness_mean | compactness_mean | concavity_mean | concave points_mean | symmetry_mean |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 842302 | 17.99 | 10.38 | 122.80 | 1001.0 | 0.11840 | 0.27760 | 0.3001 | 0.14710 | 0.2419 |
| **1** | 842517 | 20.57 | 17.77 | 132.90 | 1326.0 | 0.08474 | 0.07864 | 0.0869 | 0.07017 | 0.1812 |
| **2** | 84300903 | 19.69 | 21.25 | 130.00 | 1203.0 | 0.10960 | 0.15990 | 0.1974 | 0.12790 | 0.2069 |
| **3** | 84348301 | 11.42 | 20.38 | 77.58 | 386.1 | 0.14250 | 0.28390 | 0.2414 | 0.10520 | 0.2597 |
| **4** | 84358402 | 20.29 | 14.34 | 135.10 | 1297.0 | 0.10030 | 0.13280 | 0.1980 | 0.10430 | 0.1809 |

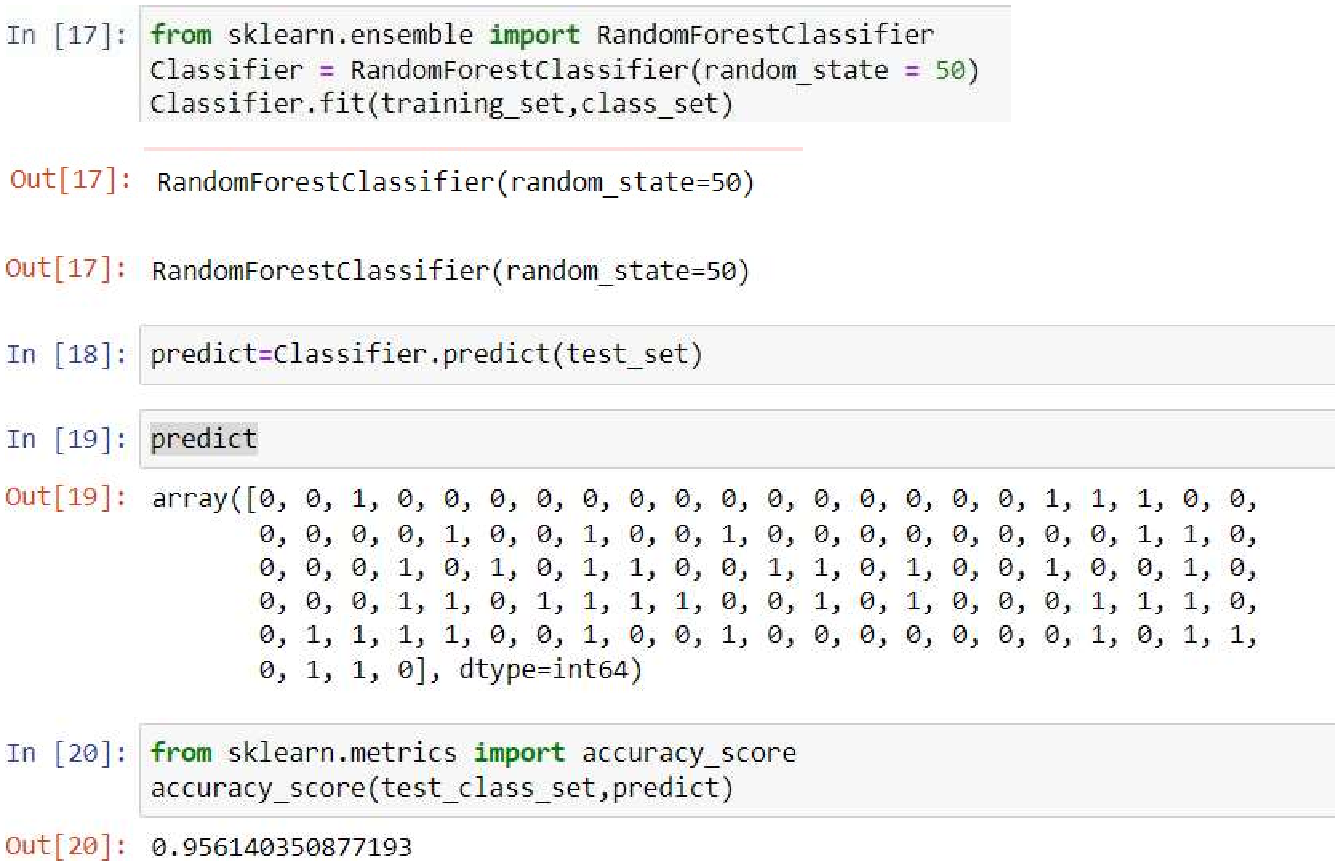
5 rows × 32 columns

```
In [4]: df.set_index(['id'], inplace = True)
```

```
In [6]: df['diagnosis'] = df['diagnosis'].map({'M':1, 'B':0})
```



```
In [7]:  df.apply(lambda x: x.isnull().sum())

Out[7]:  radius_mean                0
         texture_mean               0
         perimeter_mean             0
         area_mean                  0
         smoothness_mean            0
         compactness_mean           0
         concavity_mean             0
         concave points_mean        0
         symmetry_mean              0
         fractal_dimension_mean     0
         radius_se                  0
         texture_se                 0
         perimeter_se               0
         area_se                    0
         smoothness_se              0
         compactness_se             0
         concavity_se               0
         concave points_se          0
         symmetry_se                0
         fractal_dimension_se       0
         radius_worst               0
         texture_worst              0
         perimeter_worst            0
         area_worst                 0
         smoothness_worst           0
         compactness_worst          0
         concavity_worst            0
         concave points_worst       0
         symmetry_worst             0
         fractal_dimension_worst    0
         diagnosis                  0
         dtype: int64

In [8]:  df.diagnosis.unique()

Out[8]:  array([1, 0], dtype=int64)

In [13]: feature_space = df.iloc[:, df.columns != 'diagnosis']
         feature_class = df.iloc[:, df.columns == 'diagnosis']

In [14]: from sklearn.model_selection import train_test_split
```



```
In [17]: from sklearn.ensemble import RandomForestClassifier
         Classifier = RandomForestClassifier(random_state = 50)
         Classifier.fit(training_set,class_set)

Out[17]: RandomForestClassifier(random_state=50)

Out[17]: RandomForestClassifier(random_state=50)

In [18]: predict=Classifier.predict(test_set)

In [19]: predict

Out[19]: array([0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 0, 0,
                0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0,
                0, 0, 0, 1, 0, 1, 0, 1, 1, 0, 0, 1, 1, 0, 1, 0, 0, 1, 0, 0, 1, 0,
                0, 0, 0, 1, 1, 0, 1, 1, 1, 1, 0, 0, 1, 0, 1, 0, 0, 0, 1, 1, 1, 0,
                0, 1, 1, 1, 1, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 1,
                0, 1, 1, 0], dtype=int64)

In [20]: from sklearn.metrics import accuracy_score
         accuracy_score(test_class_set,predict)

Out[20]: 0.956140350877193
```

**Result:** Accuracy of the model is approximately 95%.