```
import pandas as p
```

```
project = p.read_excel('/content/HR_Training.xlsx')
project
```

| ition | State | Zip | DOB | Sex | MaritalDesc | CitizenDesc | HispanicLatino | RaceDesc | Da |
|---|---|---|---|---|---|---|---|---|---|
| luction nician I | MA | 1960 | 1983-10-07 00:00:00 | M | Single | US Citizen | No | White | 20 |
| r. DBA | MA | 2148 | 1975-05-05 00:00:00 | M | Married | US Citizen | No | White | 3 |
| luction nician II | MA | 1810 | 09/19/88 | F | Married | US Citizen | No | White | 20 |
| luction nician I | MA | 1886 | 09/27/88 | F | Married | US Citizen | No | White | 20 |
| luction nician I | MA | 2169 | 1989-08-09 00:00:00 | F | Divorced | US Citizen | No | White | 20 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| IT nager - DB | MA | 1915 | 1964-04-01 00:00:00 | M | Divorced | US Citizen | No | Black or African American | 20 |
| ftware gineer | MA | 2132 | 07/24/86 | F | Married | US Citizen | No | White | 20 |
| luction nician I | MA | 1801 | 1968-06-06 00:00:00 | F | Single | US Citizen | No | Black or African American | 20 |
| luction nician I | MA | 2148 | 12/21/74 | M | Single | US Citizen | No | White | 20 |
| luction nician II | MA | 2062 | 04/26/86 | M | Married | US Citizen | No | White | 8 |

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | Adinolfi, Wilson K | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | Ait Sidi, Karthikeyan | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | Akinkuolie, Sarah | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | Alagbe,Trina | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | Anderson, Carol | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
project.shape
```

```
(249, 36)
```

```
project.dtypes
```

```
Employee_Name                  object
EmpID                           int64
MarriedID                       int64
MaritalStatusID                 int64
GenderID                        int64
EmpStatusID                     int64
DeptID                          int64
PerfScoreID                     int64
FromDiversityJobFairID          int64
Salary                          int64
Termd                           int64
PositionID                      int64
Position                       object
State                          object
Zip                             int64
DOB                            object
Sex                            object
MaritalDesc                    object
CitizenDesc                    object
HispanicLatino                 object
RaceDesc                       object
DateofHire                     object
DateofTermination              object
TermReason                     object
EmploymentStatus               object
Department                     object
ManagerName                    object
ManagerID                     float64
```

```
RecruitmentSource              object
PerformanceScore               object
EngagementSurvey              float64
EmpSatisfaction                 int64
SpecialProjectsCount            int64
LastPerformanceReview_Date     object
DaysLateLast30                  int64
Absences                        int64
dtype: object
```

```
Employee_Name = {}
x = 0
for i in project['Employee_Name'].unique():
    Employee_Name[i] = x
    x = x + 1
```

```
Employee_Name
```

```
 'Monroe, Peter': 190,
 'Monterro, Luisa': 191,
 'Moran, Patrick': 192,
 'Morway, Tanya': 193,
 'Motlagh,  Dawn': 194,
 'Moumanil, Maliki ': 195,
 'Myers, Michael': 196,
 'Navathe, Kurt': 197,
 'Ndzi, Colombui': 198,
 'Ndzi, Horia': 199,
 'Newman, Richard ': 200,
 'Ngodup, Shari ': 201,
 'Nguyen, Dheepa': 202,
 'Nguyen, Lei-Ming': 203,
 'Nowlan, Kristie': 204,
 "O'hare, Lynn": 205,
 'Oliver, Brooke ': 206,
 'Onque, Jasmine': 207,

 'Osturnka, Adeel': 208,
 'Owad, Clinton': 209,
 'Ozark, Travis': 210,
 'Panjwani, Nina': 211,
 'Patronick, Lucas': 212,
 'Pearson, Randall': 213,
 'Pelletier, Ermine': 215,
 'Perry, Shakira': 216,
 'Peters, Lauren': 217,
 'Peterson, Ebonee  ': 218,
 'Petingill, Shana  ': 219,
 'Petrowsky, Thelma': 220,
 'Pham, Hong': 221,
 'Pitt, Brad ': 222,
 'Potts, Xana': 223,
 'Power, Morissa': 224,
 'Punjabhi, Louis  ': 225,
 'Purinton, Janine': 226,
 'Quinn, Sean': 227,
 'Rachael, Maggie': 228,
 'Rarrick, Quinn': 229,
 'Ren, Kylo': 230,
 'Rhoads, Thomas': 231,
 'Rivera, Haley  ': 232,
 'Roberson, May': 233,
 'Robertson, Peter': 234,
 'Robinson, Alain  ': 235,
 'Robinson, Cherly': 236,
 'Robinson, Elias': 237,
 'Roby, Lori ': 238,
 'Roehrich, Bianca': 239,
 'Roper, Katie': 240,
 'Rose, Ashley  ': 241,
 'Rossetti, Bruno': 242,
 'Roup,Simon': 243,
 'Ruiz, Ricardo': 244,
 'Saada, Adell': 245,
 'Saar-Beckles, Melinda': 246,
 'Sadki, Nore  ': 247,
 'Sahoo, Adil': 248,
 'Smith, Martin': 214}
```

```
project['Employee_Name'] = project['Employee_Name'].map(Employee_Name)
```

```
project.head()
```

|   | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
project['Position'].unique()
```

```
array(['Production Technician I', 'Sr. DBA', 'Production Technician II',
       'Software Engineer', 'IT Support', 'Data Analyst',
       'Database Administrator', 'Enterprise Architect', 'Sr. Accountant',
       'Production Manager', 'Accountant I', 'Area Sales Manager',
       'Software Engineering Manager', 'BI Director',
       'Director of Operations', 'Sr. Network Engineer', 'Sales Manager',
       'BI Developer', 'IT Manager - Support', 'Network Engineer',
       'IT Director', 'Director of Sales', 'Administrative Assistant',
       'President & CEO', 'Senior BI Developer',
       'Shared Services Manager', 'IT Manager - Infra',
       'Principal Data Architect', 'Data Architect', 'IT Manager - DB'],
      dtype=object)
```

```
Position = {}
x = 0
for i in project['Position'].unique():
    Position[i] = x
    x = x + 1
```

```
project['Position'] = project['Position'].map(Position)
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
State = {}
x = 0
for i in project['State'].unique():
    State[i] = x
    x = x + 1
```

```
project['State'] = project['State'].map(State)
```

```
project.head()
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
project['State'].unique()
```

```
array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16,
       17, 18, 19, 20, 21])
```

```
project
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID |
|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 |

```
project['DOB'].unique()
```

```
       '02/16/84', '02/21/84', '03/17/66', '09/16/85',
       datetime.datetime(1986, 10, 6, 0, 0),
       datetime.datetime(1984, 11, 3, 0, 0),
       datetime.datetime(1992, 7, 5, 0, 0), '09/22/76', '11/15/76',
       '01/28/91', datetime.datetime(1972, 11, 9, 0, 0), '03/22/66',
       datetime.datetime(1986, 6, 11, 0, 0), '04/13/64', '08/19/59',
       datetime.datetime(1986, 7, 11, 0, 0),
       datetime.datetime(1969, 8, 9, 0, 0), '04/17/86',
       datetime.datetime(1989, 11, 11, 0, 0), '01/19/76', '11/27/79',
       '09/21/54', datetime.datetime(1973, 8, 12, 0, 0),
       datetime.datetime(1970, 8, 10, 0, 0),
       datetime.datetime(1977, 10, 11, 0, 0),
       datetime.datetime(1980, 2, 2, 0, 0), '02/24/69', '04/23/86',
       datetime.datetime(1972, 1, 7, 0, 0), '07/25/79',
       datetime.datetime(1986, 9, 12, 0, 0), '04/26/84',
       datetime.datetime(1984, 9, 5, 0, 0), '06/14/87', '01/17/79',
       datetime.datetime(1984, 10, 6, 0, 0),
       datetime.datetime(1982, 2, 9, 0, 0), '12/27/88', '10/26/81',
       '03/26/81', '03/19/79', datetime.datetime(1988, 5, 10, 0, 0),
       '12/26/76', '03/28/82', '10/22/75', '02/14/73',
       datetime.datetime(1972, 9, 11, 0, 0),
       datetime.datetime(1986, 7, 7, 0, 0), '08/25/76',
       datetime.datetime(1986, 10, 12, 0, 0),
       datetime.datetime(1974, 7, 11, 0, 0),
       datetime.datetime(1987, 7, 11, 0, 0), '11/22/77', '05/21/87',
       datetime.datetime(1987, 7, 1, 0, 0),
       datetime.datetime(1984, 1, 7, 0, 0), '05/30/68',
       datetime.datetime(1981, 10, 8, 0, 0), '06/29/85', '08/17/92',
       datetime.datetime(1986, 5, 10, 0, 0), '04/24/70',
       datetime.datetime(1976, 3, 12, 0, 0),
       datetime.datetime(1979, 4, 4, 0, 0),
       datetime.datetime(1984, 7, 7, 0, 0),
       datetime.datetime(1974, 1, 12, 0, 0), '04/18/80', '04/25/70',
       datetime.datetime(1989, 2, 5, 0, 0), '03/28/83',
       datetime.datetime(1977, 8, 4, 0, 0),
       datetime.datetime(1967, 3, 6, 0, 0), '03/31/89', '11/23/85',
       '09/30/80', datetime.datetime(1952, 11, 2, 0, 0),
       datetime.datetime(1990, 11, 5, 0, 0),

       datetime.datetime(1976, 11, 12, 0, 0), '11/24/79', '05/19/82',
       datetime.datetime(1979, 1, 5, 0, 0), '02/20/79',
       datetime.datetime(1984, 5, 9, 0, 0), '03/17/88', '07/18/89',
       '07/20/86', '08/17/86', datetime.datetime(1977, 9, 5, 0, 0),
       datetime.datetime(1979, 10, 3, 0, 0), '09/16/84',
       datetime.datetime(1988, 6, 3, 0, 0), '11/23/81', '08/29/88',
       '10/15/84', '06/19/61', '09/22/70',
       datetime.datetime(1984, 6, 11, 0, 0),
       datetime.datetime(1980, 12, 5, 0, 0), '12/31/84',
       datetime.datetime(1954, 12, 10, 0, 0), '07/22/82',
       datetime.datetime(1973, 12, 1, 0, 0),
       datetime.datetime(1981, 5, 9, 0, 0),
       datetime.datetime(1972, 3, 7, 0, 0),
       datetime.datetime(1974, 7, 1, 0, 0),
       datetime.datetime(1985, 7, 1, 0, 0), '01/28/85',
       datetime.datetime(1981, 11, 10, 0, 0), '05/27/73', '11/21/72',
       datetime.datetime(1974, 5, 12, 0, 0), '03/18/87',
       datetime.datetime(1973, 5, 4, 0, 0),
       datetime.datetime(1964, 4, 1, 0, 0), '07/24/86',
       datetime.datetime(1968, 6, 6, 0, 0), '12/21/74', '04/26/86'],
      dtype=object)
```

```
DOB = {}
x = 0
for i in project['DOB'].unique():
    DOB[i] = x
    x = x + 1
```

```
project['DOB'] = project['DOB'].map(DOB)
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
project['Sex'].unique()

     array(['M ', 'F'], dtype=object)
```

```
Sex = {
    'M':0,
    'F':1
}
project['Sex'] = project['Sex'].map(Sex)
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
Sex = {}
x = 0
for i in project['Sex'].unique():
    Sex[i] = x
    x = x + 1
```

```
project['Sex'] = project['Sex'].map(Sex)
```

```
project.head()
```

```
MaritalDesc = {}
x = 0
for i in project['MaritalDesc'].unique():
    MaritalDesc[i] = x
    x = x + 1
```

```
project['MaritalDesc'] = project['MaritalDesc'].map(MaritalDesc)
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
CitizenDesc = {}
x = 0
for i in project['CitizenDesc'].unique():
    CitizenDesc[i] = x
    x = x + 1
```

```
project['CitizenDesc'] = project['CitizenDesc'].map(CitizenDesc)
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |

```
HispanicLatino = {}
x = 0
for i in project['HispanicLatino'].unique():
    HispanicLatino[i] = x
    x = x + 1
```

```
project['HispanicLatino'] = project['HispanicLatino'].map(HispanicLatino)
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
RaceDesc = {}
x = 0
for i in project['RaceDesc'].unique():
    RaceDesc[i] = x
    x = x + 1
```

```
project['RaceDesc'] = project['RaceDesc'].map(RaceDesc)
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |

```
DateofHire = {}
x = 0
for i in project['DateofHire'].unique():
    DateofHire[i] = x
    x = x + 1
```

```
project['DateofHire'] = project['DateofHire'].map(DateofHire)
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
DateofTermination = {}
x = 0
for i in project['DateofTermination'].unique():
    DateofTermination[i] = x
    x = x + 1
```

```
project['DateofTermination'] = project['DateofTermination'].map(DateofTermination)
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
TermReason = {}
x = 0
for i in project['TermReason'].unique():
    TermReason[i] = x
    x = x + 1
```

```
project['TermReason'] = project['TermReason'].map(TermReason)
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
EmploymentStatus = {}
x = 0
for i in project['EmploymentStatus'].unique():
    EmploymentStatus[i] = x
    x = x + 1
```

```
project['EmploymentStatus'] = project['EmploymentStatus'].map(EmploymentStatus)
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
Department = {}
x = 0
for i in project['Department'].unique():
    Department[i] = x
    x = x + 1
```

```
project['Department'] = project['Department'].map(Department)
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
ManagerName  = {}
x = 0
for i in project['ManagerName'].unique():
    ManagerName [i] = x
    x = x + 1
```

```
project['ManagerName'] = project['ManagerName'].map(ManagerName)
```

```
project.head()
```

| ceDesc | DateofHire | DateofTermination | TermReason | EmploymentStatus | Department | ManagerN |
|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | |
| 0 | 1 | 1 | 1 | 1 | 1 | |
| 0 | 0 | 2 | 2 | 1 | 0 | |
| 0 | 2 | 0 | 0 | 0 | 0 | |
| 0 | 3 | 3 | 3 | 1 | 0 | |

```
RecruitmentSource  = {}
x = 0
for i in project['RecruitmentSource'].unique():
    RecruitmentSource [i] = x
    x = x + 1
```

```
project['RecruitmentSource'] = project['RecruitmentSource'].map(RecruitmentSource)
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
PerformanceScore   = {}
x = 0
for i in project['PerformanceScore'].unique():
    PerformanceScore  [i] = x
    x = x + 1
```

```
project['PerformanceScore'] = project['PerformanceScore'].map(PerformanceScore)
```

```
project.head()
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
LastPerformanceReview_Date   = {}
x = 0
for i in project['LastPerformanceReview_Date'].unique():
    LastPerformanceReview_Date  [i] = x
    x = x + 1
```

```
project['LastPerformanceReview_Date'] = project['LastPerformanceReview_Date'].map(LastPerform
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
Absences = {}
x = 0
for i in project['Absences'].unique():
    Absences[i] = x
    x = x + 1
```

```
project['Absences'] = project['Absences'].map(Absences)
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
import tensorflow as t
from tensorflow.keras.utils import to_categorical
```

```
ip = project.drop('Absences',axis = 1)
```

```
op = to_categorical(project['Absences'])
```

```
ip.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10026 | 0 | 0 | 1 | 1 | 5 | |
| **1** | 1 | 10084 | 1 | 1 | 1 | 5 | 3 | |
| **2** | 2 | 10196 | 1 | 1 | 0 | 5 | 5 | |
| **3** | 3 | 10088 | 1 | 1 | 0 | 1 | 5 | |
| **4** | 4 | 10069 | 0 | 2 | 0 | 5 | 5 | |

```
op
```

```
array([[1., 0., 0., ..., 0., 0., 0.],
       [0., 1., 0., ..., 0., 0., 0.],
       [0., 0., 1., ..., 0., 0., 0.],
       ...,
       [0., 0., 0., ..., 0., 0., 0.],
       [0., 0., 0., ..., 0., 0., 0.],
       [0., 0., 0., ..., 0., 0., 0.]], dtype=float32)
```

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

```
layer1 = Dense(1)
layer2 = Dense(50)
layer3 = Dense(50)
layer4 = Dense(20,activation='softmax')
```

```
model = Sequential()
model.add(layer1)
model.add(layer2)
model.add(layer3)
model.add(layer4)


model.compile(loss='categorical_crossentropy',optimizer='adam',metrics='accuracy')


model.fit(ip,op,epochs=100)
```

```
Epoch 72/100
8/8 [==============================] - 0s 3ms/step - loss: nan - accuracy: 0.0482
Epoch 73/100
8/8 [==============================] - 0s 2ms/step - loss: nan - accuracy: 0.0482
Epoch 74/100
8/8 [==============================] - 0s 2ms/step - loss: nan - accuracy: 0.0482
Epoch 75/100
8/8 [==============================] - 0s 3ms/step - loss: nan - accuracy: 0.0482
Epoch 76/100
8/8 [==============================] - 0s 2ms/step - loss: nan - accuracy: 0.0482
Epoch 77/100
8/8 [==============================] - 0s 2ms/step - loss: nan - accuracy: 0.0482
Epoch 78/100
8/8 [==============================] - 0s 2ms/step - loss: nan - accuracy: 0.0482
Epoch 79/100

8/8 [==============================] - 0s 4ms/step - loss: nan - accuracy: 0.0482
Epoch 80/100
8/8 [==============================] - 0s 3ms/step - loss: nan - accuracy: 0.0482
Epoch 81/100
8/8 [==============================] - 0s 3ms/step - loss: nan - accuracy: 0.0482
Epoch 82/100
8/8 [==============================] - 0s 3ms/step - loss: nan - accuracy: 0.0482
Epoch 83/100
8/8 [==============================] - 0s 3ms/step - loss: nan - accuracy: 0.0482
Epoch 84/100
8/8 [==============================] - 0s 2ms/step - loss: nan - accuracy: 0.0482
Epoch 85/100
8/8 [==============================] - 0s 3ms/step - loss: nan - accuracy: 0.0482
Epoch 86/100
8/8 [==============================] - 0s 3ms/step - loss: nan - accuracy: 0.0482
Epoch 87/100
8/8 [==============================] - 0s 6ms/step - loss: nan - accuracy: 0.0482
Epoch 88/100
8/8 [==============================] - 0s 3ms/step - loss: nan - accuracy: 0.0482
Epoch 89/100
8/8 [==============================] - 0s 2ms/step - loss: nan - accuracy: 0.0482
Epoch 90/100
8/8 [==============================] - 0s 3ms/step - loss: nan - accuracy: 0.0482
Epoch 91/100
8/8 [==============================] - 0s 2ms/step - loss: nan - accuracy: 0.0482
Epoch 92/100
8/8 [==============================] - 0s 3ms/step - loss: nan - accuracy: 0.0482
Epoch 93/100
8/8 [==============================] - 0s 2ms/step - loss: nan - accuracy: 0.0482
```

```
Epoch 94/100
8/8 [==============================] - 0s 4ms/step - loss: nan - accuracy: 0.0482
Epoch 95/100
8/8 [==============================] - 0s 2ms/step - loss: nan - accuracy: 0.0482
Epoch 96/100
8/8 [==============================] - 0s 2ms/step - loss: nan - accuracy: 0.0482
Epoch 97/100
8/8 [==============================] - 0s 2ms/step - loss: nan - accuracy: 0.0482
Epoch 98/100
8/8 [==============================] - 0s 2ms/step - loss: nan - accuracy: 0.0482
Epoch 99/100
8/8 [==============================] - 0s 2ms/step - loss: nan - accuracy: 0.0482
Epoch 100/100
8/8 [==============================] - 0s 2ms/step - loss: nan - accuracy: 0.0482
<tensorflow.python.keras.callbacks.History at 0x7faa86d6e790>
```

```
import pandas as p
```

```
project = p.read_excel('/content/HR_Testing.xlsx')
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | Salter, Jason | 10229 | 0 | 2 | 1 | 5 | 3 | |
| **1** | Sander, Kamrin | 10169 | 1 | 1 | 0 | 1 | 5 | |
| **2** | Sewkumar, Nori | 10071 | 0 | 0 | 0 | 3 | 5 | |
| **3** | Shepard, Anita | 10179 | 1 | 1 | 0 | 1 | 3 | |
| **4** | Shields, Seffi | 10091 | 1 | 1 | 0 | 1 | 5 | |

```
project.shape
```

```
(62, 36)
```

```
project.dtypes
```

```
Employee_Name                   object
EmpID                            int64
MarriedID                        int64
MaritalStatusID                  int64
```

```
GenderID                        int64
EmpStatusID                     int64
DeptID                          int64
PerfScoreID                     int64
FromDiversityJobFairID          int64
Salary                          int64
Termd                           int64
PositionID                      int64
Position                       object
State                          object
Zip                             int64
DOB                            object
Sex                            object
MaritalDesc                    object
CitizenDesc                    object
HispanicLatino                 object
RaceDesc                       object
DateofHire                     object
DateofTermination              object
TermReason                     object
EmploymentStatus               object
Department                     object
ManagerName                    object
ManagerID                     float64
RecruitmentSource              object
PerformanceScore               object
EngagementSurvey              float64
EmpSatisfaction                 int64
SpecialProjectsCount            int64
LastPerformanceReview_Date     object
DaysLateLast30                  int64
Absences                        int64
dtype: object
```

```
Employee_Name = {}
x = 0
for i in project['Employee_Name'].unique():
    Employee_Name[i] = x
    x = x + 1
```

```
project['Employee_Name'] = project['Employee_Name'].map(Employee_Name)
```

```
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10229 | 0 | 2 | 1 | 5 | 3 | |
| **1** | 1 | 10169 | 1 | 1 | 0 | 1 | 5 | |
| **2** | 2 | 10071 | 0 | 0 | 0 | 3 | 5 | |

```
Position = {}
x = 0
for i in project['Position'].unique():
    Position[i] = x
    x = x + 1


project['Position'] = project['Position'].map(Position)
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10229 | 0 | 2 | 1 | 5 | 3 | |
| **1** | 1 | 10169 | 1 | 1 | 0 | 1 | 5 | |
| **2** | 2 | 10071 | 0 | 0 | 0 | 3 | 5 | |
| **3** | 3 | 10179 | 1 | 1 | 0 | 1 | 3 | |
| **4** | 4 | 10091 | 1 | 1 | 0 | 1 | 5 | |

```
State = {}
x = 0
for i in project['State'].unique():
    State[i] = x
    x = x + 1


project['State'] = project['State'].map(State)
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10229 | 0 | 2 | 1 | 5 | 3 | |
| **1** | 1 | 10169 | 1 | 1 | 0 | 1 | 5 | |
| **2** | 2 | 10071 | 0 | 0 | 0 | 3 | 5 | |
| **3** | 3 | 10179 | 1 | 1 | 0 | 1 | 3 | |
| **4** | 4 | 10091 | 1 | 1 | 0 | 1 | 5 | |

```
DOB = {}
x = 0
for i in project['DOB'].unique():
    DOB[i] = x
    x = x + 1
```

```
project['DOB'] = project['DOB'].map(DOB)
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10229 | 0 | 2 | 1 | 5 | 3 | |
| **1** | 1 | 10169 | 1 | 1 | 0 | 1 | 5 | |
| **2** | 2 | 10071 | 0 | 0 | 0 | 3 | 5 | |
| **3** | 3 | 10179 | 1 | 1 | 0 | 1 | 3 | |
| **4** | 4 | 10091 | 1 | 1 | 0 | 1 | 5 | |

```
Sex = {}
x = 0
for i in project['Sex'].unique():
    Sex[i] = x
    x = x + 1
```

```
project['Sex'] = project['Sex'].map(Sex)
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10229 | 0 | 2 | 1 | 5 | 3 | |
| **1** | 1 | 10169 | 1 | 1 | 0 | 1 | 5 | |
| **2** | 2 | 10071 | 0 | 0 | 0 | 3 | 5 | |
| **3** | 3 | 10179 | 1 | 1 | 0 | 1 | 3 | |
| **4** | 4 | 10091 | 1 | 1 | 0 | 1 | 5 | |

```
MaritalDesc = {}
x = 0
for i in project['MaritalDesc'].unique():
    MaritalDesc[i] = x
    x = x + 1
project['MaritalDesc'] = project['MaritalDesc'].map(MaritalDesc)
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10229 | 0 | 2 | 1 | 5 | 3 | |
| **1** | 1 | 10169 | 1 | 1 | 0 | 1 | 5 | |
| **2** | 2 | 10071 | 0 | 0 | 0 | 3 | 5 | |
| **3** | 3 | 10179 | 1 | 1 | 0 | 1 | 3 | |
| **4** | 4 | 10091 | 1 | 1 | 0 | 1 | 5 | |

```
CitizenDesc = {}
```

```
x = 0
for i in project['CitizenDesc'].unique():
    CitizenDesc[i] = x
    x = x + 1
project['CitizenDesc'] = project['CitizenDesc'].map(CitizenDesc)
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10229 | 0 | 2 | 1 | 5 | 3 | |
| **1** | 1 | 10169 | 1 | 1 | 0 | 1 | 5 | |
| **2** | 2 | 10071 | 0 | 0 | 0 | 3 | 5 | |
| **3** | 3 | 10179 | 1 | 1 | 0 | 1 | 3 | |
| **4** | 4 | 10091 | 1 | 1 | 0 | 1 | 5 | |

```
HispanicLatino = {}
x = 0
for i in project['HispanicLatino'].unique():
    HispanicLatino[i] = x
    x = x + 1
project['HispanicLatino'] = project['HispanicLatino'].map(HispanicLatino)
project.head()
```

| PositionID | Position | State | Zip | DOB | Sex | MaritalDesc | CitizenDesc | HispanicLatino |
|---|---|---|---|---|---|---|---|---|
| 9 | 0 | 0 | 2452 | 0 | 0 | 0 | 0 | 0 |
| 19 | 1 | 0 | 2154 | 1 | 1 | 1 | 0 | 0 |
| 19 | 1 | 0 | 2191 | 2 | 1 | 2 | 0 | 0 |
| 15 | 2 | 0 | 1773 | 3 | 1 | 1 | 0 | 0 |
| 19 | 1 | 0 | 2149 | 4 | 1 | 1 | 0 | 0 |

```
RaceDesc = {}
x = 0
for i in project['RaceDesc'].unique():
    RaceDesc[i] = x
    x = x + 1
project['RaceDesc'] = project['RaceDesc'].map(RaceDesc)
project.head()
```

| | Employee_Name | EmpID | MarriedID | MaritalStatusID | GenderID | EmpStatusID | DeptID | Per |
|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 10229 | 0 | 2 | 1 | 5 | 3 | |
| **1** | 1 | 10169 | 1 | 1 | 0 | 1 | 5 | |
| **2** | 2 | 10071 | 0 | 0 | 0 | 3 | 5 | |
| **3** | 3 | 10179 | 1 | 1 | 0 | 1 | 3 | |
| **4** | 4 | 10091 | 1 | 1 | 0 | 1 | 5 | |

```
DateofHire = {}
x = 0
for i in project['DateofHire'].unique():
    DateofHire[i] = x
    x = x + 1
project['DateofHire'] = project['DateofHire'].map(DateofHire)
project.head()
```

| Position | State | Zip | DOB | Sex | MaritalDesc | CitizenDesc | HispanicLatino | RaceDesc | Date |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 2452 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 1 | 0 | 2154 | 1 | 1 | 1 | 0 | 0 | 0 | |
| 1 | 0 | 2191 | 2 | 1 | 2 | 0 | 0 | 1 | |
| 2 | 0 | 1773 | 3 | 1 | 1 | 0 | 0 | 2 | |
| 1 | 0 | 2149 | 4 | 1 | 1 | 0 | 0 | 2 | |

```
DateofTermination = {}
```

```
x = 0
for i in project['DateofTermination'].unique():
    DateofTermination[i] = x
    x = x + 1
project['DateofTermination'] = project['DateofTermination'].map(DateofTermination)
project.head()
```

| on | State | Zip | DOB | Sex | MaritalDesc | CitizenDesc | HispanicLatino | RaceDesc | DateofHir |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 2452 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 2154 | 1 | 1 | 1 | 0 | 0 | 0 | 1 |
| 1 | 0 | 2191 | 2 | 1 | 2 | 0 | 0 | 1 | 2 |
| 2 | 0 | 1773 | 3 | 1 | 1 | 0 | 0 | 2 | 3 |
| 1 | 0 | 2149 | 4 | 1 | 1 | 0 | 0 | 2 | 4 |

```
TermReason = {}
x = 0
for i in project['TermReason'].unique():
    TermReason[i] = x
    x = x + 1
project['TermReason'] = project['TermReason'].map(TermReason)
project.head()
```

| MaritalDesc | CitizenDesc | HispanicLatino | RaceDesc | DateofHire | DateofTermination | Term |
|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | |
| 1 | 0 | 0 | 0 | 1 | 1 | |
| 2 | 0 | 0 | 1 | 2 | 1 | |
| 1 | 0 | 0 | 2 | 3 | 1 | |
| 1 | 0 | 0 | 2 | 4 | 1 | |

```
EmploymentStatus = {}
x = 0
for i in project['EmploymentStatus'].unique():
    EmploymentStatus[i] = x
    x = x + 1
```

```
project['EmploymentStatus'] = project['EmploymentStatus'].map(EmploymentStatus)
project.head()
```

| nicLatino | RaceDesc | DateofHire | DateofTermination | TermReason | EmploymentStatus | Depart |
|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | |
| 0 | 0 | 1 | 1 | 1 | 1 | Produ |
| 0 | 1 | 2 | 1 | 1 | 1 | Produ |
| 0 | 2 | 3 | 1 | 1 | 1 | |
| 0 | 2 | 4 | 1 | 1 | 1 | Produ |

```
Department = {}
x = 0
for i in project['Department'].unique():
    Department[i] = x
    x = x + 1
project['Department'] = project['Department'].map(Department)
project.head()
```

| .cLatino | RaceDesc | DateofHire | DateofTermination | TermReason | EmploymentStatus | Departme |
|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | |
| 0 | 0 | 1 | 1 | 1 | 1 | |
| 0 | 1 | 2 | 1 | 1 | 1 | |
| 0 | 2 | 3 | 1 | 1 | 1 | |
| 0 | 2 | 4 | 1 | 1 | 1 | |

```
ManagerName = {}
x = 0
for i in project['ManagerName'].unique():
    ManagerName[i] = x
    x = x + 1
project['ManagerName'] = project['ManagerName'].map(ManagerName)
project.head()
```

| o | RaceDesc | DateofHire | DateofTermination | TermReason | EmploymentStatus | Department | Mar |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 0 | 0 | 1 | 1 | 1 | 1 | 1 | |
| 0 | 1 | 2 | 1 | 1 | 1 | 1 | |
| 0 | 2 | 3 | 1 | 1 | 1 | 0 | |

```
project['ManagerID'].unique()
```

```
array([ 4., 16., nan,  7., 11.,  1., 22., 15., 19.,  6., 12.,  2., 14.,
       20., 21., 18., 17., 10., 13., 39.])
```

```
ManagerID = {}
x = 0
for i in project['ManagerID'].unique():
    ManagerID[i] = x
    x = x + 1
project['ManagerID'] = project['ManagerID'].map(ManagerID)
project.head()
```

| atino | RaceDesc | DateofHire | DateofTermination | TermReason | EmploymentStatus | Department |
|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 0 | 1 | 2 | 1 | 1 | 1 | 1 |
| 0 | 2 | 3 | 1 | 1 | 1 | 0 |
| 0 | 2 | 4 | 1 | 1 | 1 | 1 |

```
RecruitmentSource = {}
x = 0
for i in project['RecruitmentSource'].unique():
    RecruitmentSource[i] = x
    x = x + 1
project['RecruitmentSource'] = project['RecruitmentSource'].map(RecruitmentSource)
project.head()
```

| eofTermination | TermReason | EmploymentStatus | Department | ManagerName | ManagerID | Recruit |
|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | |

```
PerformanceScore = {}
x = 0
for i in project['PerformanceScore'].unique():
    PerformanceScore[i] = x
    x = x + 1
project['PerformanceScore'] = project['PerformanceScore'].map(PerformanceScore)
project.head()
```

| RecruitmentSource | PerformanceScore | EngagementSurvey | EmpSatisfaction | SpecialProjects |
|---|---|---|---|---|
| 0 | 0 | 4.20 | 3 | |
| 0 | 0 | 3.51 | 3 | |
| 1 | 0 | 5.00 | 5 | |
| 0 | 0 | 3.31 | 3 | |
| 0 | 0 | 4.81 | 4 | |

```
project['EngagementSurvey'].unique()
```

```
array([4.2 , 3.51, 5.  , 3.31, 4.81, 3.32, 4.68, 4.3 , 2.4 , 3.8 , 3.73,
       3.27, 4.83, 4.1 , 1.81, 3.9 , 4.7 , 4.36, 3.4 , 4.5 , 3.93, 3.69,
       3.98, 4.21, 2.44, 4.6 , 4.4 , 2.81, 4.33, 3.21, 3.11, 2.5 , 3.42,
       3.6 , 4.07, 3.2 ])
```

```
LastPerformanceReview_Date = {}
x = 0
for i in project['LastPerformanceReview_Date'].unique():
    LastPerformanceReview_Date[i] = x
    x = x + 1
project['LastPerformanceReview_Date'] = project['LastPerformanceReview_Date'].map(LastPerform
project.head()
```

| RecruitmentSource | PerformanceScore | EngagementSurvey | EmpSatisfaction | SpecialProjects |
|---|---|---|---|---|
| 0 | 0 | 4.20 | 3 | |
| 0 | 0 | 3.51 | 3 | |
| 1 | 0 | 5.00 | 5 | |
| 0 | 0 | 3.31 | 3 | |
| 0 | 0 | 4.81 | 4 | |

```
Absences = {}
x = 0
for i in project['Absences'].unique():
    Absences[i] = x
    x = x + 1
project['Absences'] = project['Absences'].map(Absences)
project.head()
```

| RecruitmentSource | PerformanceScore | EngagementSurvey | EmpSatisfaction | SpecialProject |
|---:|---:|---:|---:|---|
| 0 | 0 | 4.20 | 3 | |
| 0 | 0 | 3.51 | 3 | |
| 1 | 0 | 5.00 | 5 | |
| 0 | 0 | 3.31 | 3 | |
| 0 | 0 | 4.81 | 4 | |

```
project.dtypes
```

```
Employee_Name               int64
EmpID                       int64
MarriedID                   int64
MaritalStatusID             int64
GenderID                    int64
EmpStatusID                 int64
DeptID                      int64
PerfScoreID                 int64
FromDiversityJobFairID      int64
Salary                      int64
Termd                       int64
PositionID                  int64
Position                    int64
State                       int64
Zip                         int64
DOB                         int64
Sex                         int64
MaritalDesc                 int64
CitizenDesc                 int64
HispanicLatino              int64
RaceDesc                    int64
DateofHire                  int64
DateofTermination           int64
TermReason                  int64
EmploymentStatus            int64
Department                  int64
ManagerName                 int64
ManagerID                   int64
RecruitmentSource           int64
PerformanceScore            int64
EngagementSurvey          float64
EmpSatisfaction             int64
```

```
SpecialProjectsCount            int64
LastPerformanceReview_Date      int64
DaysLateLast30                  int64
Absences                        int64
dtype: object
```

```
import tensorflow as t
```

```
ip_test = project.drop('Absences',axis = 1)
```

```
op_test = to_categorical(project['Absences'])
```

```
ip_test.head()
```

|  | ManagerID | RecruitmentSource | PerformanceScore | EngagementSurvey | EmpSatisfaction | Speci |
|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 4.20 | 3 |  |  |
| 1 | 0 | 0 | 3.51 | 3 |  |  |
| 2 | 1 | 0 | 5.00 | 5 |  |  |
| 3 | 0 | 0 | 3.31 | 3 |  |  |
| 4 | 0 | 0 | 4.81 | 4 |  |  |

```
op_test
```

```
array([[1., 0., 0., ..., 0., 0., 0.],
       [1., 0., 0., ..., 0., 0., 0.],
       [0., 1., 0., ..., 0., 0., 0.],
       ...,
       [0., 0., 0., ..., 0., 0., 0.],
       [0., 0., 0., ..., 0., 0., 0.],
       [1., 0., 0., ..., 0., 0., 0.]], dtype=float32)
```

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

```
layer1 = Dense(1)
layer2 = Dense(50)
layer3 = Dense(50)
layer4 = Dense(20,activation='softmax')
```

```
model = Sequential()
model.add(layer1)
model.add(layer2)
model.add(layer3)
model.add(layer3)
model.add(layer4)


model.compile(loss='categorical_crossentropy',optimizer='adam',metrics='accuracy')


model.fit(ip_test,op_test,epochs=69)
```

```
2/2 [==============================] - 0s 10ms/step - loss: 38.6928 - accuracy: 0.08
Epoch 42/69
2/2 [==============================] - 0s 5ms/step - loss: 39.3171 - accuracy: 0.032
Epoch 43/69
2/2 [==============================] - 0s 7ms/step - loss: 36.8526 - accuracy: 0.064
Epoch 44/69
2/2 [==============================] - 0s 4ms/step - loss: 30.8691 - accuracy: 0.112
Epoch 45/69
2/2 [==============================] - 0s 7ms/step - loss: 28.3646 - accuracy: 0.080
Epoch 46/69
2/2 [==============================] - 0s 9ms/step - loss: 18.7188 - accuracy: 0.096
Epoch 47/69
2/2 [==============================] - 0s 11ms/step - loss: 20.7793 - accuracy: 0.06
Epoch 48/69
2/2 [==============================] - 0s 7ms/step - loss: 19.7653 - accuracy: 0.080
Epoch 49/69
2/2 [==============================] - 0s 6ms/step - loss: 23.2657 - accuracy: 0.064
Epoch 50/69
2/2 [==============================] - 0s 9ms/step - loss: 24.8243 - accuracy: 0.048
Epoch 51/69
2/2 [==============================] - 0s 8ms/step - loss: 20.7279 - accuracy: 0.048
Epoch 52/69
2/2 [==============================] - 0s 9ms/step - loss: 22.4157 - accuracy: 0.080
Epoch 53/69
2/2 [==============================] - 0s 9ms/step - loss: 25.7106 - accuracy: 0.080

Epoch 54/69
2/2 [==============================] - 0s 6ms/step - loss: 26.7497 - accuracy: 0.080
Epoch 55/69
2/2 [==============================] - 0s 5ms/step - loss: 26.1982 - accuracy: 0.080
Epoch 56/69
2/2 [==============================] - 0s 5ms/step - loss: 28.6438 - accuracy: 0.032
Epoch 57/69
2/2 [==============================] - 0s 6ms/step - loss: 27.0792 - accuracy: 0.048
Epoch 58/69
2/2 [==============================] - 0s 4ms/step - loss: 28.8575 - accuracy: 0.032
Epoch 59/69
2/2 [==============================] - 0s 5ms/step - loss: 28.9213 - accuracy: 0.080
Epoch 60/69
2/2 [==============================] - 0s 4ms/step - loss: 29.7513 - accuracy: 0.048
Epoch 61/69
2/2 [==============================] - 0s 4ms/step - loss: 23.3008 - accuracy: 0.048
Epoch 62/69
2/2 [==============================] - 0s 5ms/step - loss: 27.2852 - accuracy: 0.032
Epoch 63/69
2/2 [==============================] - 0s 5ms/step - loss: 25.9540 - accuracy: 0.032
Epoch 64/69
2/2 [==============================] - 0s 4ms/step - loss: 28.8429 - accuracy: 0.048
Epoch 65/69
2/2 [==============================] - 0s 4ms/step - loss: 33.2973 - accuracy: 0.112
Epoch 66/69
Epoch 66/69
2/2 [==============================] - 0s 7ms/step - loss: 31.5869 - accuracy: 0.016
Epoch 67/69
2/2 [==============================] - 0s 9ms/step - loss: 28.7190 - accuracy: 0.048
Epoch 68/69
2/2 [==============================] - 0s 6ms/step - loss: 29.9635 - accuracy: 0.032
Epoch 69/69
2/2 [==============================] - 0s 6ms/step - loss: 27.2601 - accuracy: 0.048
<tensorflow.python.keras.callbacks.History at 0x7faa85989610>
```

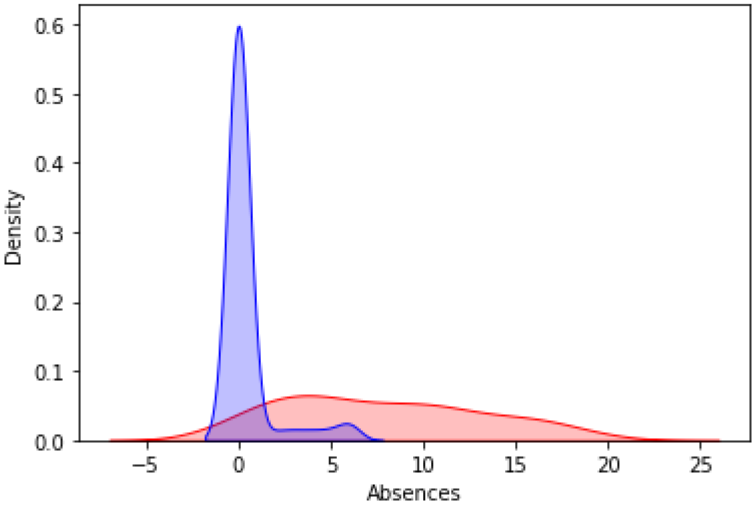
```
layer1.get_weights()
```

```
[array([[-0.07723173],
        [ 0.23071378],
        [-0.4926701 ],
        [-0.38494053],
        [ 0.29654947],
        [ 0.0414238 ],
        [ 0.16082083],
        [-0.32095495],
        [ 0.10225023],
        [ 0.01087936],
        [-0.3978219 ],
        [-0.26009592],
        [-0.1250251 ],
        [ 0.10927513],
        [-0.04844533],
        [-0.29654068],
        [-0.39980078],
        [-0.17536235],
        [ 0.2692776 ],
        [-0.16052821],
        [-0.06006066],
        [-0.28567898],
        [-0.33971837],
        [ 0.16718414],
        [ 0.3100464 ],
        [-0.16766624],
        [-0.479031  ],
        [ 0.28623664],
        [-0.28735864],
        [-0.22092485],
        [-0.47261232],
        [-0.07842687],
        [-0.34218964],
        [ 0.20234701],
        [-0.36720696]], dtype=float32), array([-0.07723936], dtype=float32)]
```

```
import seaborn as s
```

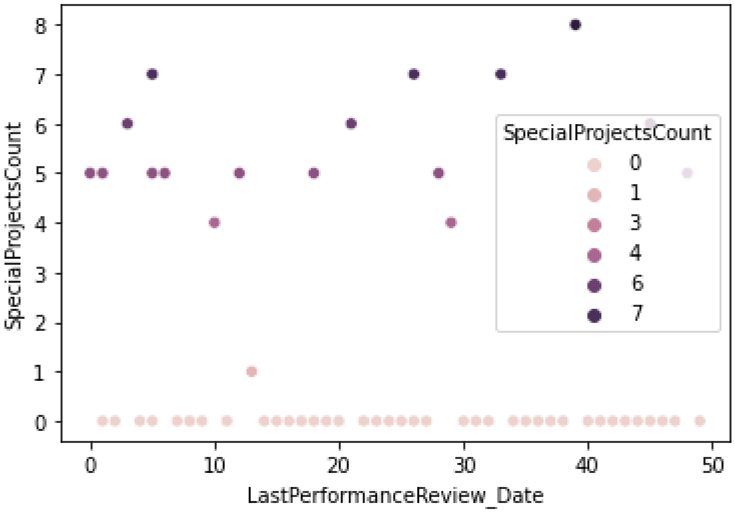
```
s.kdeplot(project['Absences'], shade=True, color="r")
s.kdeplot(project['DaysLateLast30'], shade=True, color="b")
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7faa86ca2590>
```



```
s.scatterplot(data=project, x="LastPerformanceReview_Date", y="SpecialProjectsCount", hue="Sp
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7faa863da510>
```



13m 33s completed at 11:10 PM