IARE

INSTITUTE OF AERONAUTICAL ENGINEERING

(An Autonomous Institute affiliated to JNTUH, Hyderabad)

Dundigal, Hyderabad - 500 043

LABORATORY WORK BOOK

Name of the Student : HIMAKAR C

Class : CSE-B Semester : VI

Course Code : ACIC08 Course Name : DMKD Laboratory

Name of the Course Faculty : Dr. D. DURGA BHAVANI Faculty ID : IARE

Exercise Number : Week Number : 10 Date :

Roll Number									
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S. No.	Exercise Number	EXERCISE NAME	MARKS AWARDED					
			Aim/ Preparation	Algorithm / Procedure / Performance in the Lab	Source Code / Calculations and Graphs	Program Execution / Results and Error Analysis	Viva - Voce	Total
			4	4	4	4	4	20
1	10.1	Build Bayesian network model using existing loan default data	4	4	4	4	4	20
2								
3								
4	10.2	Visualize Tree Augmented Naive Bayes Model						
5								
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8								
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10								
11								
12								

Signature of the Student

Signature of the Faculty

START WRITING FROM HERE

10.1 Build Bayesian network model using existing loan default data

```
from pgmpy.models import BayesianModel
from pgmpy.estimators import MaximumLikelihood
                                    Estimator
import pandas as pd

d = pd.read_csv('loan-default_dataset.csv')

m = BayesianModel([('income', 'loan_status'),
                   ('credit_score', 'loan_status'),
                   ('loan_status', 'approval')])

m.fit(d, estimator = MaximumLikelihoodEstimator)

print('Bayesian Network structure:')

print(m.edges())

print('Bayesian Network parameters:')

for c in m.get_cpds():
    print(c)
```

ROLL NUMBER :

OUTPUT:

Bayesian Network structure:

[('income', 'loan_status'), ('credit_score', 'loan_status'),
('loan_status', 'approval')]

Bayesian Network Parameters:

credit_score	credit_score_0	0.1
credit_score	credit_score_1	0.9
income	income_0	0.3
income	income_1	0.7
loan_status	credit_score_0	0.2
loan_status	credit_score_1	0.8
loan_status	income_0	0.5
loan_status	income_1	0.5
approval	loan_status_0	0.4
approval	loan_status_1	0.6

ROLL NUMBER :

102 Visualize Tree Augmented Naive Bayes Model

```
import numpy as np
import pandas as pd
from pgmpy.estimators import TreeAugmentedNaiveBayes
from pgmpy.models import BayesianModel
import networkx as nx
import matplotlib.pyplot as plt

d = pd.read_csv('loan_default_dataset.csv')
t = TreeAugmentedNaiveBayes()
t.fit(d)
tg = t.graph_
plt.figure(figsize = (10, 6))
p = nx.spring_layout(tg)
nx.draw(tg, p, with_labels = True, node_size=2000,
        node_color = 'skyblue', font_size=10,
        font_weight = 'bold')
el = nx.get_edge_attributes(tg, 'weight')
nx.draw_networkx_edge_labels(tg, p, edge_labels=el,
                             font_color='red')
plt.title('Tree-Augmented Naive Bayes Graph')
plt.show()
```

ROLL NUMBER :

OUTPUT:

Tree-Augmented Naive Bayes Graph