Programs for Final Exams

1. Given a simplified map or 2 X2 or 3X3 maze grid, implement a Breadth-First Search algorithm to find the shortest route.
2. Construct a semantic network using the provided knowledge base with is-a and has relationships. Use this structure to infer new facts.
3. Student Performance Prediction using Linear Regression
4. Cryotherapy Treatment Prediction using Logistic Regression
5. Adults' income or room occupancy prediction using decision tree
6. Fire-bellied Toad Classification with KNN
7. KNN Hyperparameter Tuning (Grid Search vs Randomized Search)
8. Bayesian Network model to determine patients' health or weather condition
9. Classifiers - Gaussian Naïve Bayes Classifier, Random Forest
10. Solve knapsack problem using GA
11. Travelling salesman problem
12. Classify medical dataset and authenticate bank notes using MLP
13. Predict house price using shallow or deep MLP
14. Classify fashion dataset using shallow or deep MLP

Sample Programming Question:

1. You are tasked with building a K-Nearest Neighbors (KNN) classifier to predict the presence of the Fire-bellied Toad using the ISOLET dataset, which contains environmental and spatial data.

a) Write a Python program using KNN to classify whether the Fire-bellied Toad is present based on the following features: elevation, slope, soil moisture index, NDVI, average temperature, precipitation, and distance to water. (6 marks)

b) Describe the structure of the feature set and label array used in your implementation and explain the role of distance metric in KNN. (2 marks)

c) Suggest ONE (1) method to improve the performance of the KNN model for large datasets. Justify your suggestion. (2 marks)