Date		Session No	8

Topic : BI Questions - Solutions

1. What is the Intelligence Phase in decision-making? Provide an example.

- **Solution**: The Intelligence Phase is where the problem or opportunity is identified, and data is gathered to understand the current situation.
    - **Example**: A bank notices that many customers are closing their accounts. In the intelligence phase, the bank gathers feedback, transaction records, and reviews competitors' offers to understand the cause of customer churn.

2. How do Decision Support Systems (DSS) assist in decision-making?

- **Solution**: DSS help decision-makers by providing data access, analysis tools, simulations, and visualizations to evaluate complex situations. They are especially useful in semi-structured or unstructured environments.
    - **Example**: In logistics, FedEx uses DSS to optimize delivery routes by simulating scenarios like weather and traffic.

3. What are the phases of the decision-making process? Briefly explain each.

- **Solution**:
    1. **Intelligence Phase**: Identify the problem or opportunity.
    2. **Design Phase**: Develop alternatives or solutions.
    3. **Choice Phase**: Evaluate and select the best alternative.
    4. **Implementation Phase**: Execute the chosen solution.

4. What is Business Intelligence (BI)? Give an example.

- **Solution**: BI refers to technologies and strategies used to analyze data and provide actionable insights for business decisions.
    - **Example**: Netflix uses BI tools to analyze user viewing patterns and recommend personalized content, increasing user engagement.

5. How does a Decision Support System (DSS) differ from a Management Information System (MIS)?

- **Solution**:
    - **MIS** provides routine reports and handles structured decision-making.
    - **DSS** supports complex, unstructured decision-making by allowing for data modeling, simulations, and "what-if" analyses.

6. What is a Neural Network, and how does it work?

- **Solution**: A neural network is a computational model inspired by the human brain, consisting of layers of nodes (neurons). Data passes through these layers, and the network learns patterns to make predictions or decisions.

7. What is a Support Vector Machine (SVM)? How is it used in classification problems?

- **Solution**: SVM is a machine learning algorithm used to classify data by finding the best boundary (hyperplane) that separates different classes.

8. Explain the difference between certainty, uncertainty, and risk in decision-making.

- **Solution**:
    - **Certainty**: All information is known, and outcomes are predictable.
    - **Uncertainty**: Some information is missing, and outcomes are unpredictable.
    - **Risk**: Probabilities of different outcomes can be estimated.

9. What is Sentiment Analysis? Give an example of its application.

- **Solution**: Sentiment analysis is the process of analyzing text to determine the emotional tone or opinion expressed.
    - **Example**: Companies use sentiment analysis on customer reviews to understand the general mood towards their products (positive, neutral, or negative).

10. What is the purpose of Decision Trees in decision analytics?

- **Solution**: Decision Trees help in visualizing and analyzing decision paths by breaking them into branches based on conditions, leading to a final outcome.
    - **Example**: A company might use a decision tree to determine whether to approve a loan, considering factors like credit score, income, and employment status.

11. How is the Nearest Neighbor method used for prediction?

- **Solution**: The Nearest Neighbor method predicts the outcome of a new data point by finding the closest data points in a dataset and using their values.

12. How do Multi-Criteria Decision Making (MCDM) and Pairwise Comparisons work?

- **Solution**: MCDM helps in evaluating multiple conflicting criteria. Pairwise Comparisons involve comparing each alternative to every other to determine preferences.
    - **Example**: When buying a car, MCDM might evaluate price, safety, and fuel efficiency, while pairwise comparisons rank these criteria by importance.

13. What is the difference between supervised and unsupervised learning in neural networks?

- **Solution**:
    - **Supervised learning**: The model learns from labeled data.
    - **Unsupervised learning**: The model finds patterns in data without labels.

14. How does mathematical programming optimization help in decision-making?

- **Solution**: Mathematical programming optimization helps find the best solution to a problem by optimizing a mathematical model, subject to constraints.
    - **Example**: A company might use linear programming to minimize costs while meeting production requirements.

15. What is a Decision Support System's Knowledge Base?

- **Solution**: A knowledge base in a DSS stores rules, procedures, and historical information relevant to decision-making. It helps by providing expert knowledge or best practices for specific problems.

16. How do spreadsheets assist in decision modeling?

- **Solution**: Spreadsheets allow users to build models that simulate different scenarios by inputting variables and calculating outcomes. Excel can be used for financial modeling, inventory management, etc.

```python
# Example: Using Excel to calculate the profit based on variable costs
import pandas as pd

# Create a DataFrame representing a simple financial model
data = {'Revenue': [10000], 'Cost': [5000]}
df = pd.DataFrame(data)

df['Profit'] = df['Revenue'] - df['Cost']
print(df)
```

```
   Revenue  Cost  Profit
0    10000  5000    5000
```

17. What is the Role of Sensitivity Analysis in Neural Networks?

- **Solution**: Sensitivity Analysis helps understand how changes in input variables affect the output of a neural network, "illuminating the black box" by showing which features are most influential.

18. Explain how Big Data Analytics is used in businesses.

- **Solution**: Big Data Analytics involves processing large datasets to uncover patterns, trends, and insights that can help businesses make more informed decisions.
    - **Example**: Uber uses big data analytics to adjust pricing dynamically based on demand, traffic conditions, and weather.

19. What is a Document-Driven DSS, and how is it used?

- **Solution**: A Document-Driven DSS manages and retrieves unstructured documents and information, helping with decisions based on textual data.
    - **Example**: A law firm uses a Document-Driven DSS to search through legal documents and case files.

20. How can Python be used to implement a basic Decision Tree for classification?

```python
# Example using Decision Tree in Python (scikit-learn)
from sklearn.datasets import load_iris
from sklearn.tree import DecisionTreeClassifier

iris = load_iris()
model = DecisionTreeClassifier()
model.fit(iris.data, iris.target)

print(model.predict([[5.0, 3.6, 1.4, 0.2]]))  # Predict for a new sample
```

```
[0]
```

END