Unit 10 - Week 8

Assignment 8

Due on 2019-09-26, 23:45 EST.

1. Choose one of the following options:
   a. If the function returns the index of the first element that satisfies the condition, return the index.
   b. If the function returns the sum of the elements that satisfy the condition, return the sum.

2. Consider the following graph G = (V, E) with vertices V and edges E. Determine whether the graph is:
   a. Connected
   b. Disconnected
   c. Acyclic
   d. Cyclic

3. Consider the following data points (x, y):
   a. Plot the data points on a scatter plot.
   b. Fit a linear regression line to the data points.
   c. Calculate the coefficient of determination (R^2).

4. Consider the following sequence of numbers:
   a. Find the median of the sequence.
   b. Find the mode of the sequence.
   c. Find the range of the sequence.

5. Consider the following statements:
   a. If a rectangle is a square, then it is a parallelogram.
   b. If a parallelogram is a square, then it is a rectangle.
   c. If a rectangle is a parallelogram, then it is a square.

6. Consider the following scenario:
   a. Design a flowchart to solve the problem.
   b. Write a program to implement the solution.
   c. Test the program with sample data.

7. Consider the following optimization problem:
   a. Formulate the problem as a linear program.
   b. Solve the linear program using the simplex method.
   c. Interpret the solution and determine the optimal solution.

8. Consider the following situation:
   a. Identify the key variables and constraints.
   b. Formulate the problem as a mathematical model.
   c. Solve the problem using appropriate techniques.

9. Consider the following scenario:
   a. Develop a network diagram to represent the problem.
   b. Calculate the critical path.
   c. Identify the slack time for each activity.

10. Consider the following matrix:
    a. Find the determinant of the matrix.
    b. Find the inverse of the matrix.
    c. Solve the system of linear equations using the matrix.

11. Consider the following data set:
    a. Calculate the mean, median, and mode.
    b. Calculate the standard deviation and variance.
    c. Plot the data set on a histogram.

12. Consider the following scenario:
    a. Formulate a decision tree for the problem.
    b. Calculate the expected value for each decision.
    c. Determine the optimal decision.

13. Consider the following problem:
    a. Formulate the problem as a linear program.
    b. Solve the linear program using the simplex method.
    c. Interpret the solution and determine the optimal solution.

14. Consider the following scenario:
    a. Develop a project schedule using the critical path method.
    b. Calculate the float time for each activity.
    c. Identify the critical path and the activities that can be delayed.

15. Consider the following problem:
    a. Formulate the problem as a mathematical model.
    b. Solve the problem using appropriate techniques.
    c. Interpret the solution and determine the optimal solution.

16. Consider the following situation:
    a. Develop a network diagram to represent the problem.
    b. Calculate the critical path.
    c. Identify the slack time for each activity.

17. Consider the following data set:
    a. Calculate the mean, median, and mode.
    b. Calculate the standard deviation and variance.
    c. Plot the data set on a histogram.

18. Consider the following scenario:
    a. Formulate a decision tree for the problem.
    b. Calculate the expected value for each decision.
    c. Determine the optimal decision.

19. Consider the following problem:
    a. Formulate the problem as a linear program.
    b. Solve the linear program using the simplex method.
    c. Interpret the solution and determine the optimal solution.

20. Consider the following scenario:
    a. Develop a project schedule using the critical path method.
    b. Calculate the float time for each activity.
    c. Identify the critical path and the activities that can be delayed.