Northern University

of Business and Technology Khulna

Lab Report on Lab 03

Course Title: Linear Programming and Combinatorial Optimization Lab

Lab Title: Python Basics: Variable Usage, Conditionals, List Manipulation, Function and Graph Plotting

Submitted By

Name   : Hemendra Nath Mondal
Section : 4B
ID   : 11220320873
Dept   : Computer Science and
            Engineering

Submitted To

Name   : Shovon Mandal
Designation : Lecturer
Dept   : Computer Science and
              Engineering

Date of Submission: 01.05.2024
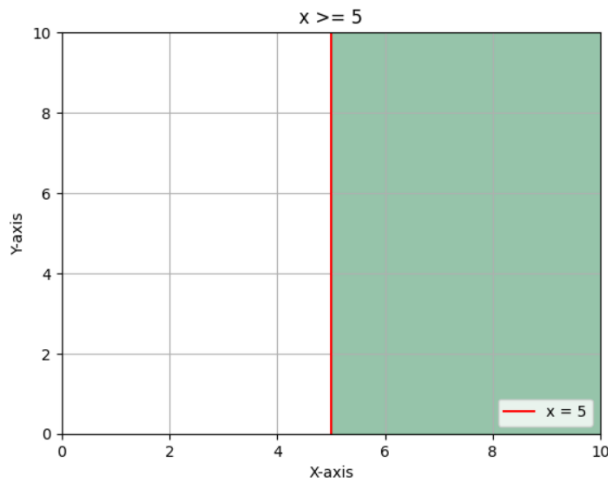
01.Plot the line x=5 and shade the region where x>=5

Objectives:

Show how to graphically express linear inequalities in two variables using graphs and improve understanding of how to indicate particular relationships on a graph by shading sections.

LAB Work:

Determine the given equations and inequalities that represent lines on a coordinate plane, plot the lines that correspond to each restriction. According to the problem descriptions, shade the areas that meet the provided inequality.

Output:

Analysis and Results:

The link between plotted lines and shaded regions is made clear in the graph. It offers a simple graphic representation that facilitates an understanding of linear inequalities.
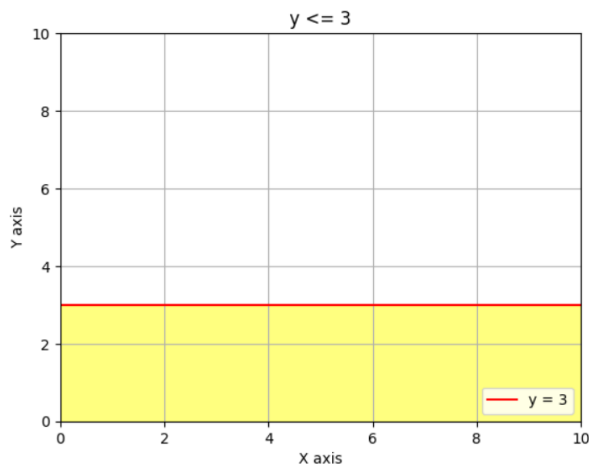
02. Plot the line y=3 and shade the region where y<=3

Objectives:

Graphical representation and enhance the knowledge of how to read and display graph constraints like y<=3.

LAB Work:

Identify the given equation representing the line y=3, Shade the area below the line y=3 to represent the inequality y <=3. Add axis labels, title, legend, gridlines for clarity and display the graph

Output:

Analysis and Results:

The line y=3 and the shaded area below it are shown in the graph in an effective way, highlighting the inequality y<=3 and giving the constraint a clear visual expression.

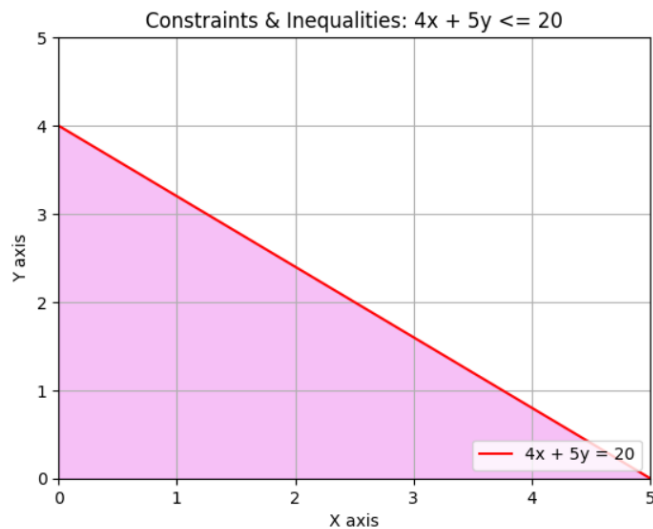## 03. Plot the line 4x+5y=20 and shade the region where 4x+5y<=20

Objectives:

Demonstrate plotting of the line 4x+5y=20 on a coordinate plane. Highlight coloring to illustrate the difference visually in the area where 4x+5y<=20.

LAB Work:

Generate corresponding x and y values. Plot the line on the coordinate plane using plt.plot(). Fill the area below the line where the inequality 4x+5y<=20 is satisfied using plt.fill_between(). Set limits for the graph using plt.xlim() and plt.ylim().

Output:

Constraints & Inequalities: 4x + 5y <= 20

4x + 5y = 20

Analysis and Results:

This visual representation makes it easier to evaluate limitations in a graphical context and helps to understand the link between the inequality and the equation.

04. Plot the line 0.5x+0.25y=2.5 and shade the region where 0.5x + 0.25y<=2.5
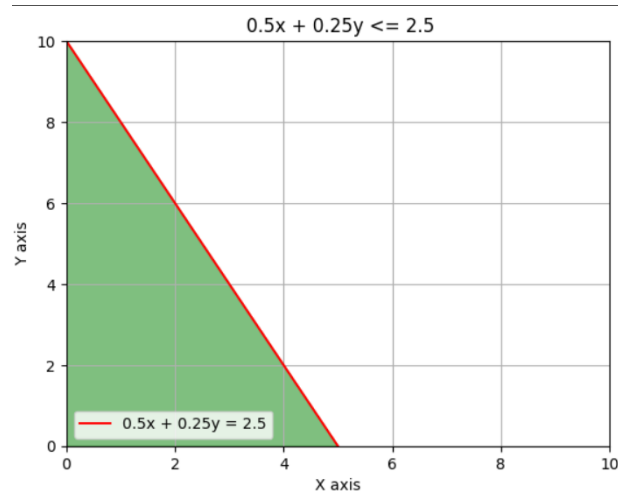
Objectives:

 The plotting of the line 0.5x+0.25y=2.5c acoordinate plane. To illustrate the inequality, showing how the region where .5x+0.25v = 2.5 is shaded.

LAB Work:

Generate corresponding x and y values. Fill the area below the line where the inequality 0.5x+0.25y<=2.5 is satisfied using plt.fill_between(). Set limits for the graph using plt.xlim() and plt.ylim().

Output:

Analysis and Results:

The line 0.5x+0.25y=2.5 is clearly depicted on the graph, and the area below it where the inequality 0.5x+0.25y<=2.5 is met is shaded. This visual representation makes it easier to evaluate limitations in a graphical context and helps to understand the link between the inequality and the equation.

05. Plot the line 3x-4y=0 and shade the region where 3x-4y<=0
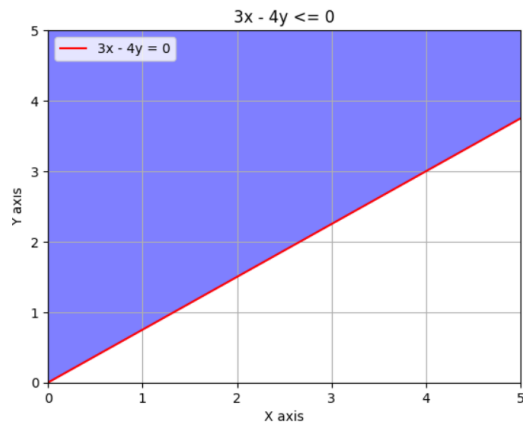
Objectives:

The visually show the difference, highlight the shade of the region where 3x-4y≤0.

LAB Work:

Plot the line on the coordinate plane using plt.plot(). Fill the area below the line where the inequality 3x-4ys0 is satisfied using plt.fill_between(). Add axis labels, title, legend, and gridlines for clarity. Set limits for the graph using plt.xlim() and plt.ylim().

Output:

Analysis and Results:

The line 3x-4y=0 is effectively shown on the graph, and the area below it where the inequality 3x-4y\le0 is met is shaded. This depiction helps clarify limitations in a graphical context and makes the link between the equation and the inequality easier to understand.