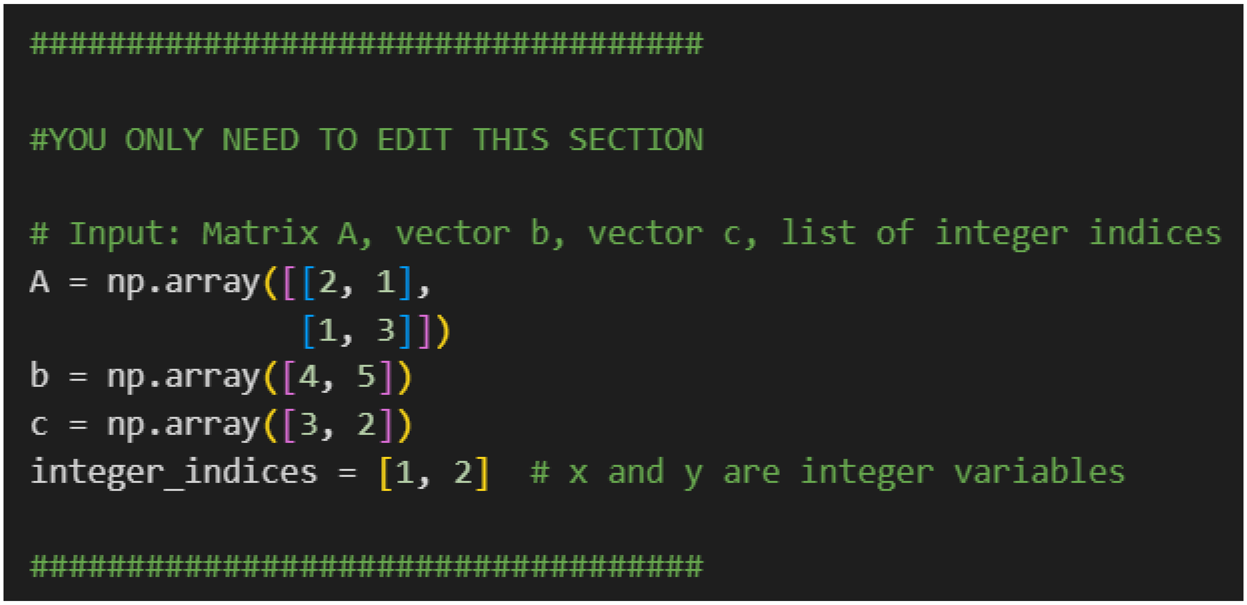
The EECS_261A.ipynb file contains the source code and written description for my program.

I recommend using Google Colab (https://colab.research.google.com/) to run the .ipynb file. This will open up an interactive notebook. The notebook is divided into sections and subsections; use the table of contents to easily navigate through the sections.

The notebook is divided into two main sections. The First section called `Branch and Bound Algorithm` contains my Python implementation of the Branch and Bound algorithm and an in-depth explanation of the algorithm. The second section called `Example Cases` is where I include several example cases such as 2, 3, 4 decision variable mixed integer linear programs and the edge cases of Infeasible and Unbounded problems.

Make sure to run the cells for `Branch and Bound Algorithm` first before running the example cases.

INPUT HANDLING:
In every example case, there is a clearly indicated section in the code where you can edit the input matrix A, vector b, vector c, and the integer indices. For example, this is a screenshot of the part of the code from `Example Cases` → `2 decision variables` section:



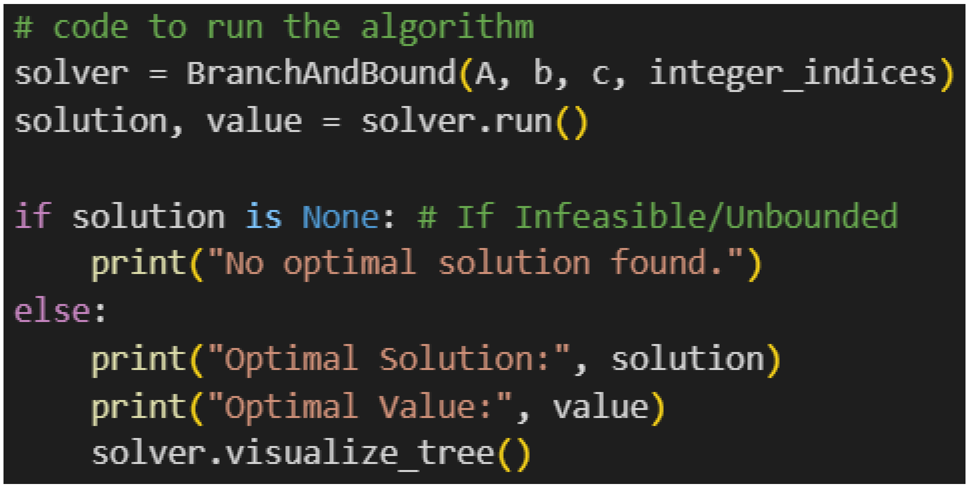
```
###################################

#YOU ONLY NEED TO EDIT THIS SECTION

# Input: Matrix A, vector b, vector c, list of integer indices
A = np.array([[2, 1],
              [1, 3]])
b = np.array([4, 5])
c = np.array([3, 2])
integer_indices = [1, 2]  # x and y are integer variables

###################################
```

The code to run the model is what comes after this part (you do not need to edit):

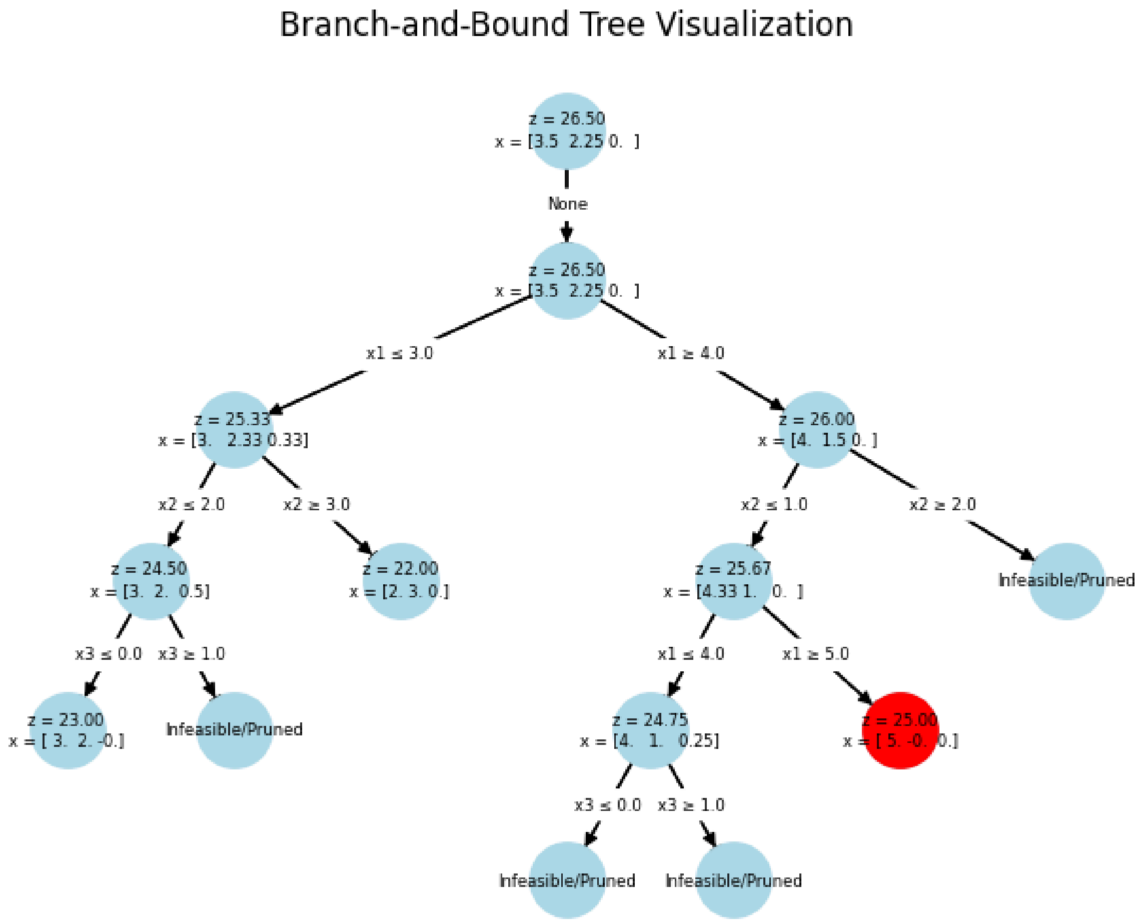


```python
# code to run the algorithm
solver = BranchAndBound(A, b, c, integer_indices)
solution, value = solver.run()

if solution is None: # If Infeasible/Unbounded
    print("No optimal solution found.")
else:
    print("Optimal Solution:", solution)
    print("Optimal Value:", value)
    solver.visualize_tree()
```

OUTPUT FORMATTING:

Each example case should draw out an enumeration tree. For example, this is a screenshot of the outputted enumeration tree from `Example Cases` → `3 decision variables` section.



In-depth explanation of the algorithm and how it constructs the enumeration tree will be found in the notebook.