

LINEAR PROGRAMMING

TAKE-HOME TEST

CODING

QUESTION 4 (TAKE-HOME TEST): ![image-2.png](attachment:image-2.png)

Solution to Question 4

```
In [12]: from pulp import LpVariable, LpProblem, LpMaximize, LpStatus, value, LpMinimize

# Delcaring variables

A = LpVariable("LampA", lowBound = 0)
B = LpVariable("LampB", lowBound = 0)
C = LpVariable("LampC", lowBound = 0)

# Defining the problem

problem = LpProblem("problem", LpMaximize)

# Defining the constraints
problem += 2*A + 3*B + C <= 400
problem += 4*A + 2*B + 3*C <= 600

# Defining the objective function

problem += 5*A + 4*B + 3*C

# Solving the problem

solution = problem.solve()
LpStatus[solution]

print(f"Number of Hours for Lamp A: {value(A)}\nNumber of Hours for Lamp B: {value(B)}")
print(f"Max Profit: {5*value(A) + 4*value(B) + 3*value(C) }")
```

```
Number of Hours for Lamp A: 125.0
Number of Hours for Lamp B: 50.0
Number of Hours for Lamp C: 0.0
Max Profit: 825.0
```

QUESTION 5 (TAKE-HOME TEST)

![image-3.png](attachment:image-3.png)

Solution to Question 5

```
In [11]: from pulp import LpVariable, LpProblem, LpMaximize, LpStatus, value, LpMinimize

# Declaring variables

AtlAudioSystems = LpVariable("AtlAudioSystems", lowBound = 45)
LitRockAudioSystems = LpVariable("LitRockAudioSystems", lowBound = 32)

# Defining the problem

problem = LpProblem("problem", LpMinimize)

# Defining constraints

problem += AtlAudioSystems + LitRockAudioSystems <= 140
problem += 20*AtlAudioSystems + 10*LitRockAudioSystems >= 1500

# Defining the objective function

problem += 31 * AtlAudioSystems + 45 * LitRockAudioSystems

# Solving the problem

solution = problem.solve()
LpStatus[solution]

print(f"Amount of audio systems that should be shipped to Atlanta: {value(AtlAudioSystems)}")
print(f"Minimum Shipping Cost: {31 * value(AtlAudioSystems) + 45 * value(LitRockAudioSystems)}")

Amount of audio systems that should be shipped to Atlanta: 59.0
Amount of audio systems that should be shipped to Little Rock: 32.0
Minimum Shipping Cost: 3269.0
```

In []: