

Tutorial 11

1. Solve the following integer program using Branch and Bound Algorithm.

$$\begin{array}{llll} \max & z = & 3x_1 + 4x_2 & \\ & s.t. & 2x_1 + x_2 & \leq 6 \\ & & 2x_1 + 3x_2 & \leq 9 \\ & & x_1, x_2 & \text{integers and } \geq 0 \end{array}$$

2. Solve the following integer program using Branch and Bound Algorithm.

$$\begin{array}{llll} \min & z = & x_1 + x_2 & \\ & s.t. & 2x_1 + 2x_2 & \geq 5 \\ & & 12x_1 + 5x_2 & \leq 30 \\ & & x_1, x_2 & \text{integers and } \geq 0 \end{array}$$

3. (Winston Sections 7, Review Problems, Group A. Problem 2 Page 407)

Five workers are available to perform four jobs. . The time it takes each worker to do each job is shown in table below

Worker	Time (hours)			
	Job 1	Job 2	Job 3	Job 4
1	10	15	10	15
2	12	8	20	16
3	12	9	12	18
4	6	12	15	18
5	16	12	8	12

Each worker is assigned no more than one job. The goal is to assign workers to jobs so as to minimise the total time required to perform the four jobs.

Use the Hungarian method to solve the problem.

4. (Winston Sections 7, Review Problems, Group A. Problem 6 Page 408)

The Gotham City police have just received three calls for police. Five cars are available. The distance (in city blocks) of each car from each call is given in the table below.

Car	Distance (Blocks)		
	Call 1	Call 2	Call 3
1	10	11	18
2	6	7	7
3	7	8	5
4	5	6	4
5	9	4	7

Gotham City wants to minimise the total distance cars must travel to respond to the three police calls.

Use the Hungarian method to determine which car should respond to which call.