NAME: DERRI COLUMBUS BOMAYE

MATRIC NO: 15/ENG02/017

DEPARTMENT: COMPUTER ENGINEERING

COURSECODE: COE512

COURSE TITLE: RELIABILITY AND MAINTAINABILITY

CLASS-WORK

QUESTION ONE SOLUTION

LINEAR PROGRAMMING CONCEPT

Linear programming is a mathematical technique for finding optimal solutions to problems that can be expressed using linear equations and inequalities. Linear programming provides a method to optimize operations within certain constraints. It is used to make processes more efficient and cost effective.

LINEAR PROGRAMMING APPLICATION TO ENGINEERING

I. Optimizing the energy use cost in a building system analysis
II. Material analysis of a truss
III. Space optimization in city planning
IV. Office design and grocery store shelves

QUESTION TWO SOLUTION

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QUESTION TWO SOLUTION

Max $z = 30x_1 + 20x_2$

Subject to

$2x_1 + x_2 \leq 1000$

$x_1 + x_2 \leq 800$

$x_1, x_2 \geq 0$

$z - 30x_1 - 20x_2 = 0$

x_1	x_2	s_1	s_2	z
2	1	1	0	1000
1	1	0	1	800
-30	-20	0	0	0

$R_1 = \text{Row } 1/2$, $R_3 = 30R_1 + R_3$, $R_2 = -R_1 + R_2$

x_1	x_2	s_1	s_2	z
1	1/2	1/2	0	500
1	1	0	1	800
-30	-20	0	0	0

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x_1	x_2	S_1	S_2	Z
1	1/2	1/2	0	500
0	1/2	-1/2	1	350
0	-5	15	0	15000

x_1	x_2	S_1	S_2	Z
1	1/2	1/2	0	500
0	1/2	-1/2	1	300
0	-5	15	0	15000

$R_2 \rightarrow 2R_2$

x_1	x_2	S_1	S_2	Z
1	1/2	1/2	0	500
0	1	-1	2	600
0	-5	15	0	15000

$R_1 = -1/2 R_2 + R_1$

$R_3 = 5R_2 + R_3$

x_1	x_2	S_1	S_2	Z
1	0	1	-1	200
0	1	-1	2	600
0	-5	15	0	15000

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x_1	x_2	S_1	S_2	Z
1	0	1	-1	200
0	1	-1	2	600
0	0	10	16	18000

$x_1 = 200$

$x_2 = 600$

$Z = 18000$