Class 8 (14.03.2017)

Make a **menu driven program** integer programming using Branch & Bound algorithm with the following options (a) initial table (b) table of i^{th} iteration (c) optimal solution (if exists otherwise generate report for infeasibility, unboundedness, alternative optimum etc.) Solve it manually first and check the answers.

1. Maximize $Z = 5x_1 + 7x_2$, Subject to $-2x_1 + 3x_2 \leq 6$, $6x_1 + x_2 \leq 30, x_1, x_2 \geq 0$ and $integers$.
   (Ans. $x_1 = \frac{21}{5}, x_2 = \frac{24}{5}, Z = \frac{273}{5}$)
2. Maximize $Z = 2x_1 + 3x_2$, Subject to $6x_1 + 5x_2 \leq 25$, $x_1 + 3x_2 \leq 10, x_1, x_2 \geq 0$ and $integers$
   (Ans. $x_1 = 2, x_2 = 2, Z = 10$)
3. Maximize $Z = 3x_1 + x_2 + 3x_3$, Subject to $-x_1 + 2x_2 + x_3 \leq 4, 2x_2 - \frac{3}{2}x_3 \leq 1, x_1 - 3x_2 + 2x_3 \leq 3, x_1, x_2, x_3 \geq 0$ and integers,
   (Ans. $x_1 = 5, x_2 = 2\ x_3 = 2, Z = 23$)
4. Maximize $Z = 2x_1 + 20x_2 - 10x_3$, Subject to $2x_1 + 20x_2 + 4x_3 \leq 15$, $6x_1 + 20x_2 + 4x_3 = 20$ $\ x_1, x_2, x_3 \geq 0$ and are $integers$
   (Ans. $x_1 = 2, x_2 = 0, x_3 = 2, Z = -16$)