Selecting an Investing Portfolio :-

Formula for Return, $\boxed{R = \dfrac{D}{P_0} + g}$

where, D = Dividend

P_0 = Price / Investment

g = Growth rate.

Source : finance formulas .net

Returns on (S_1, S_2, S_3) (H_1, H_2, H_3) (C_1, C_2)

$$X_1 = \frac{2}{40} + 0.05 = 0.1$$

$$X_2 = 0.130$$

$$X_3 = 0.073$$

$$X_4 = 0.09$$

$$X_5 = 0.1145$$

$$X_6 = 0.167$$

$$X_7 = 0.280$$

$$X_8 = 0.25$$

Decision Variable :

X_i = returns on firms

i = $S_1, S_2, S_3, H_1, H_2, H_3, C_1, C_2$

Y_i = Binary Variables.

$i \Rightarrow 1$ to buy stocks

$\cdot 0$ to not buy stocks

Objective Function :

Max $Z = 0.1 X_1 Y_1 + 0.130 X_2 Y_2 + 0.073 X_3 Y_3 + 0.09 X_4 Y_4$
$$+ 0.1145 X_5 Y_5 + 0.167 X_6 Y_6 + 0.280 X_7 Y_7 + 0.25 X_8 Y_8$$

Constraints :

$$40 X_1 Y_1 + 50 X_2 Y_2 + 80 X_3 Y_3 + 60 X_4 Y_4 + 45 X_5 Y_5 + 60 X_6 Y_6 +$$
$$30 X_7 Y_7 + 25 X_8 Y_8 \leq 2500000 ;$$

$$40 X_1 Y_1 + 50 X_2 Y_2 + 80 X_3 Y_3 \leq 1000000 ;$$

$$60 X_4 Y_4 + 45 X_5 Y_5 + 60 X_6 Y_6 \leq 1000000 ;$$

$$30 X_7 Y_7 + 25 X_8 Y_8 \leq 1000000 ;$$

$$40 X_1 Y_1 \geq 100000 ;$$

$$50 X_2 Y_2 \geq 100000 ;$$

$$80 X_3 Y \geq 100000 ;$$

$$60 X_4 Y_4 \geq 100000 ;$$

$$45 X_5 Y_5 \geq 100000 ;$$

$$60 X_6 Y_6 \geq 100000 ;$$

$$30 X_7 Y_7 \geq 100000 ;$$

$$25 X_8 Y_8 \geq 100000 ;$$

$X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8$ are integers

$Y_1, Y_2, Y_3, Y_4, Y_5, Y_6, Y_7, Y_8$ are Binary integers.

2. With no integer restriction.

Objective function:

$$\text{Max } Z = 0.1 X_1 + 0.130 X_2 + 0.073 X_3 + 0.09 X_4 + 0.1145 X_5$$
$$+ 0.167 X_6 + 0.980 X_7 + 0.25 X_8$$

Constraints:

$$40 X_1 + 50 X_2 + 80 X_3 + 60 X_4 + 45 X_5 + 60 X_6 + 30 X_7 + 25 X_8$$
$$\leq 2500000;$$

$$40 X_1 + 50 X_2 + 80 X_3 \leq 1000000;$$

$$60 X_4 + 45 X_5 + 60 X_6 \leq 1000000;$$

$$30 X_7 + 25 X_8 \leq 1000000$$

$$40 X_1 \geq 100000;$$

$$50 X_2 \geq 100000;$$

$$80 X_3 \geq 100000;$$

$$60 X_4 \geq 100000;$$

$$45 X_5 \geq 100000;$$

$$60 X_6 \geq 100000;$$

$$30 X_7 \geq 100000;$$

$$25 X_8 \geq 100000;$$