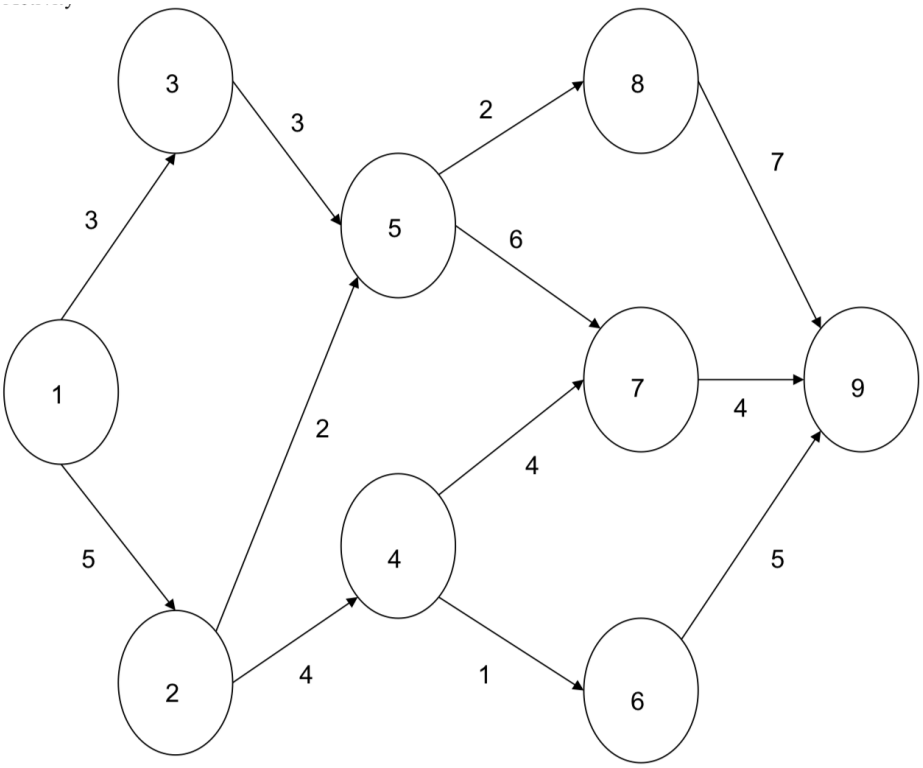
Assignment-5

Solution-1:

Given data



Decision Variables:

x12 – activity from1 to 2

x13 – activity from1 to 3

x 35 – activity from 3 to 5

x24 – activity from 2 to 4

x25 – activity from 2 to 5

x46 - activity from 4 to 6

x47 - activity from 4 to 7

x57 – activity from 5 to 7

x58 – activity from 5 to 8

x69 - activity from 6 to 9

x79 – activity from 7 to 9

x89 – activity from 8 to 9

Objective Function:

Maximum z = 5x12+3x13+3x35+2x25+4x24+2x58+6x57+4x47+x46+7x89+4x79+5x69.

Constraints:

Starting node

x13+x12=1

Intermediate nodes

x12-x25-x24 =0

x13-x35 =0

x24-x47-x46=0

x25+x35-x58-x57=0

x46-x69=0

x47+x57-x79=0

x58-x89=0

Finish node

x89+x79+x69=1.

All decision variables are non-negativity (>=0).

Solution-2:

a. Given data

	Stock							
	S1	S2	S3	H1	H2	H3	C1	C2
Price per share	$40	$50	$80	$60	$45	$60	$30	$25
Growth rate	0.05	0.10	0.03	0.04	0.07	0.15	0.22	0.25
Dividend	$2.00	$1.50	$3.50	$3.00	$2.00	$1.00	$1.80	$0.00

Fund to invest is 2.5million.

The client has stipulated that no more than 40 percent of the investment be allocated to any one of these three sectors.

To assure diversification, at least $100,000 must be invested in each of the eight stocks.

Number of shares invested in any stock must be a multiple of 1000.

Pre-calculation:

Expected return rate

$D_1 = D_0 * (1 + g)$

D_1 = Value of dividend to be paid next year

D_0 = Value of dividend paid this year

g = growth rate

P0 = D1/(*R* - g) (This is from accounting scholar.com online resources)

R = (D1/P0)+g

Return s1=0.1025=10.25%

Return s2=13.3

Return s3=7.51

Return h1=9.2

Return h2=11.7

Return h3=17

Return c1=29.3

Return c2=25.

Decision Variables:

xs1 = stocks for firm s1

xs2 = stocks for firm s2

xs3 = stocks for firm s3

xh1 = stocks for firm h1

xh2 = stocks for firm h2

xh3 = stocks for firm h3

xc1 = stocks for firm c1

xc2 = stocks for firm c2

xi =1 or 0 is binary integer

xi = s1, s2, s3, h1, h2, h3, c1, c2

1 is for stocks to buy

0 is for stocks not to buy

Objective function:

Maximum Z = 10.25xs1 + 13.3xs2 + 7.51xs3 + 9.2xh1 + 11.7xh2 + 17xh3 + 29.3xc1 + 25xc2.

Constraints:

xs1+ + xs2 + xs3 + xh1 + xh2 + xh3 + xc1 + xc2 = 2500000;

xs1 + xs2 + xs3 <= 1000000;

xh1 + xh2 + xh3 <= 1000000;

xc1 + xc2 <= 1000000;

xs1 >= 100000;

xs2 >= 100000;

xs3 >= 100000;

xh1 >= 100000;

xh2 >= 100000;

xh3 >= 100000;

xc1 >= 100000;

xc2 >= 100000;

All decision variables >=0 and integers.

b. Considering no integer restriction so

Decision Variables

xs1 = stocks for firm s1

xs2 = stocks for firm s2

xs3 = stocks for firm s3

xh1 = stocks for firm h1

xh2 = stocks for firm h2

xh3 = stocks for firm h3

xc1 = stocks for firm c1

xc2 = stocks for firm c2

or

xi = s1, s2, s3, h1, h2, h3, c1, c2

Objective Function:

Maximum Z = 10.25xs1 + 13.3xs2 + 7.51xs3 + 9.2xh1 + 11.7xh2 + 17xh3 + 29.3xc1 + 25xc2.

Constraints:

xs1+ + xs2 + xs3 + xh1 + xh2 + xh3 + xc1 + xc2 = 2500000;

xs1 + xs2 + xs3 <= 1000000;

xh1 + xh2 + xh3 <= 1000000;

xc1 + xc2 <= 1000000;

xs1 >= 100000;

xs2 >= 100000;

xs3 >= 100000;

xh1 >= 100000;

xh2 >= 100000;

xh3 >= 100000;

xc1 >= 100000;

xc2 >= 100000;

All decision variables >=0