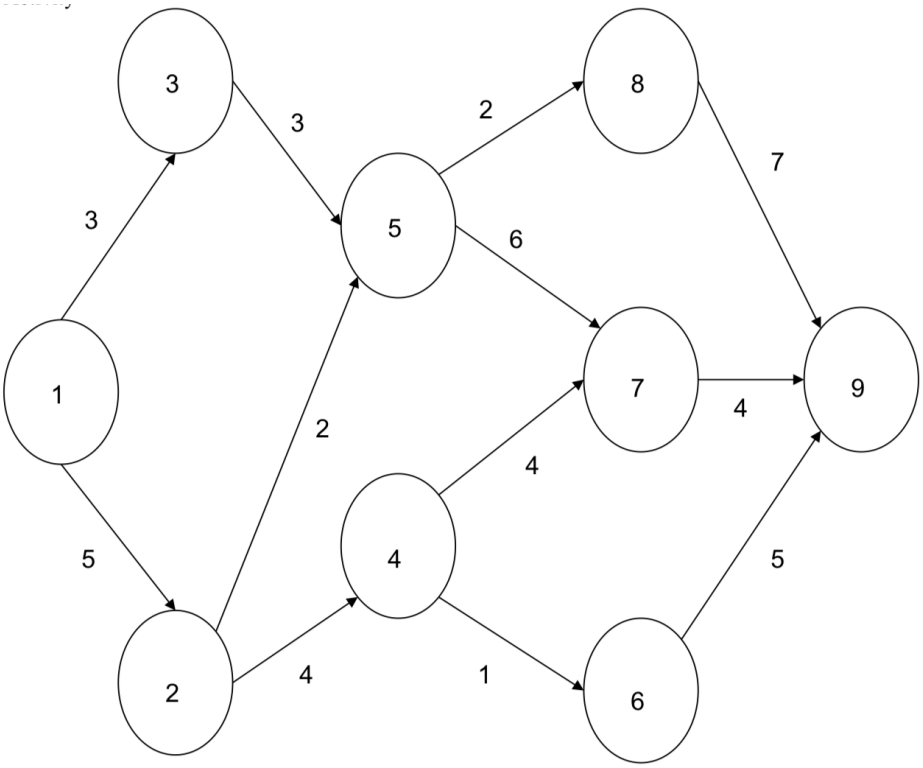
Assignment-5

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-2a:

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:

R = (D/P) + g

where

D=Dividend

P=Price

G=growth rate

R=Return

Accountingscholar.com online resource.

So, for S1 firm

S1=2/40+0.05=0.1

S2 = 0.130

S3 = 0.073

H1 = 0.09

H2 = 0.1145

H3 = 0.167

C1 = 0.280

C2 = 0.25.

Decision Variables:

Xi= returns from firms

i= 1,2,3,4,5,6,7,8=S1, S2, S3, H1, H2, H3, C1, C2 respectively.

Yi=binary variables

1= to buy stock

0=not to buy stock.

Objective Function:

Maximum: 0.1 x1 y1 + 0.130 x2 y2 + 0.073 x3 y3 + 0.09 x4 y4 + 0.1145 x5 y 5 + 0.167 x6 y6 + 0.280 x7 y7 +0.25 x8 y8.

Constraints:

Investment 2.5 million

40x1y1 + 50x2y2 + 80x3y3 + 60x4y4 + 45x5y5 + 60 x6y6 + 30x7y7 + 25 x8y8 <=2500000;

Investment not more than 40%

40 x1y1 + 50x2y2 + 80x3y3 <= 1000000;

60 x4y4 + 45 x5y5 + 60x6y6 <=1000000;

30x7y7 + 25x8y8 <= 1000000;

Invest at least

40x1y1 >= 100000

50x2y2>= 100000

80x3y3 >= 100000

60x4y4 >=100000

45x5y5 >=100000

60x6y6 >= 100000

30x7y7>=100000

25x8y8>=100000

Yi= binary integers.

i=1,2,3,4,5,6,7,8.

Solution2b:

Decision Variables:

Xi= returns from firms

i= 1,2,3,4,5,6,7,8=S1, S2, S3, H1, H2, H3, C1, C2 respectively.

Objective Function:

Maximum: 0.1 x1 + 0.130 x2 + 0.073 x3 + 0.09 x4 + 0.1145 x5 + 0.167 x6 + 0.280 x7 +0.25 x8.

Constraints:

Investment 2.5 million

40x1 + 50x2 + 80x3 + 60x4 + 45x5 + 60 x6 + 30x7 + 25 x8 <=2500000;

Investment not more than 40%

40 x1+ 50x2 + 80x3 <= 1000000;

60 x4 + 45 x5 + 60x6 <=1000000;

30x7 + 25x8 <= 1000000;

Invest at least

40x1 >= 100000

50x2>= 100000

80x3 >= 100000

60x4 >=100000

45x5 >=100000

60x6 >= 100000

30x7>=100000

25x8>=100000

Xi=1,2,3,4,5,6,7,8 >=0.