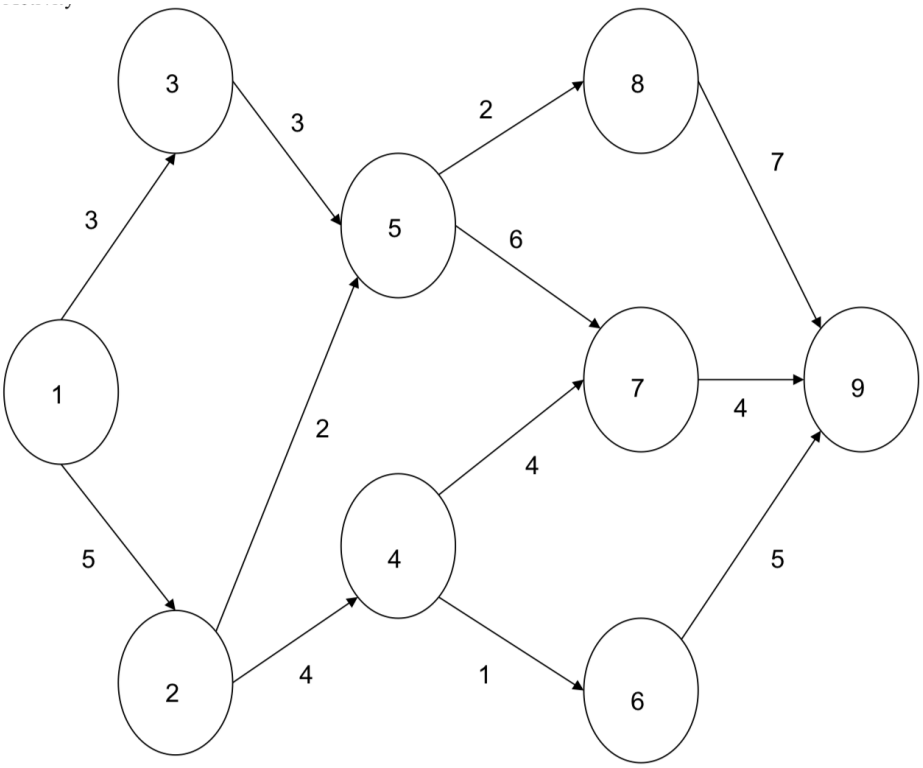
Assignment-5

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:

Return = price * growth rate +dividend

S1=4

S2 = 6.5

S3 = 5.9

H1 = 5.4

H2 = 5.1

H3 = 10

C1 = 8.4

C2 = 6.25.

Decision Variables:

Xi= returns from firms

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

Objective Function:

Maximum: 4x1 +6.5x2 + 5.9 x3 + 5.4x4 + 5.15 x5 + 10x6 +8.4x7 +6.25x8

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

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 4x1 +6.5x2 + 5.9 x3 + 5.4x4 + 5.15 x5 + 10x6 +8.4x7 +6.25x8

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.

Percentage difference = (objective function(b) -objective function(a))/objective function(a)=0.15%