ASSIGNEMENT 5

1) Max Z = 3R13 + 5R12 + 3R35 + 2R25 + 2R58 + 6R57 + 4R24 + 4R47 + 1R46 + 7R89 + 4R79 + 5R69

Origin and Destination Node = 1

Node 1: 3R13 + 5R12 = 1

Destination Node 9: 7R89 + 4R79 + 5R69 = 1

Intermediate Nodes:

Node 2: 5R12 = 2R25 + 4R24

Node 3: 3R13 = 3R35

Node 4: 4R24 = 1R46 + 4R47

Node 5: 3R35 + 2R25 = 2R58 + 6R57

Node 6: 1R46 = 5R69

Node 7: 6R57 + 4R47 = 4R79

Node 8: 2R58 = 7R89

The longest path is from node 1-2-5-7-9,which is critical path and time required for corresponding path is 17

2) In the given problem, our objective is maximizing the net returns we can calculate returns by the information given so returns will be equal to
Returns = (Price per share) * (Growth rate of share) + (Dividend per share)

Hence the objective function is

Maximize Z = 4 XS1 + 6.5 XS2 + 5.9 XS3 + 5.4 XH1 + 5.15 XH2 + 10 XH3 + 8.4 XC1 + 6.25 XC2

Subject to the constraints,

Investment constraint:

40 XS1 + 50 XS2 + 80 XS3 + 60 XH1 + 45 XH2 + 60 XH3 + 30 XC1 + 25 XC2 <= 2500000

The number of shares invested in any stock must be a multiple of 1000

1000 XSJ >= 0 (J = 1,2,3)

1000 XHJ >= 0 (J = 1,2,3)

1000 XCJ >= 0 (J = 1,2)

At least $100,000 must be invested

40 XS1 >= 100000;

50 XS2 >= 100000;

80 XS3 >= 100000;

60 XH1 >= 100000;

45 XH2 >= 100000;

60 XH3 >= 100000;

30 XC1 >= 100000;

25 XC2 >= 100000

40 percent of the investment be allocated to any one of these three sectors

40 XS1 + 50 XS2 + 80 XS3 <= 1000000

60 XH1 + 45 XH2 + 60 XH3 <= 1000000

30 XC1 + 25 XC2 <= 1000000

XSJ, XHJ, XCJ >= 0 are integers.

Using lpsolve we get the objective function,
maximum returns as 487145.2

and number of stocks are S1= 2500,

S2= 6000,
S3= 1250,

H1= 1667,

H2= 2223,

H3= 3332,

C1= 30000,

C2= 4000.

The amount invested in each stock S1= 100000,

S2= 300000,

S3= 100000,
H1= 100020,

H2= 100035,

H3= 799920,

C1= 900000,

C2= 100000.

Q 2b:

Using lpsolve for real type we get the
objective function, maximum returns as 487152.8 and

number of stocks
are S1= 2500.0,

S2= 6000.0,

S3= 1250.0,

H1= 1667.667,

H2= 2222.222,
H3= 13333.333,

C1= 30000.0,

C2= 4000.0

The amount invested in each stock

S1= 100000,

S2= 300000,

S3= 100000,
H1= 100000,

H2= 100000,

H3= 800000,

C1= 900000,

C2= 100000.

Percentage difference = (obj real – obj integer)/ obj integer

By calculating with the above formulae we get the percentage as 0.00156

By using lpsolve, there is a little difference in investment quantities which is observed in 3 software companies

H1 = (variable real – var integer)/ var integer = 0.019

H2= (variable real – var integer)/ var integer = 0.03

H3 = (variable real – var integer)/ var integer = 0.009