1. **Activity-on-arc project network:**

Let Xij be the connection from node i to node j.

Therefore, the objective function:

Maximize Z = 5X12  + 3X13 + 3X35 + 2X25  + 4X24 + 4X47 + X46 + 2X58  + 6X57 + 5X69 + 4X79 + 7X89

Constraints:

Subject to:

X13 + X12 = 1

X12 - X25 - X24 = 0

X13 - X35 = 0

X25 + X35 - X57 - X58 = 0

X24 - X47 - X46 = 0

X46 - X69 = 0

X47 + X57 - X79 = 0

X58 - X89 = 0

X89 + X79 + X69 = 1

1. **Selecting an Investment Portfolio:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | S1 | S2 | S3 | H1 | H2 | H3 | C1 | C2 |
| Dividend | 2 | 1.5 | 3.5 | 3 | 2 | 1 | 1.8 | 0 |
| price | 40 | 50 | 80 | 60 | 45 | 60 | 30 | 25 |
| Growth rate | 0.05 | 0.1 | 0.03 | 0.04 | 0.07 | 0.15 | 0.22 | 0.25 |
| return | 4 | 6.5 | 5.9 | 5.4 | 5.15 | 10 | 8.4 | 6.25 |

Therefore, the objective function is

Maximize Z = 4S1 + 6.5S2 + 5.9S3 + 5.4H1 + 5.15H2 + 10H3 + 8.4C1 + 6.25C2

Subject to the constraints:

40S1 + 50S2 + 80S3 + 60H1 + 45H2 + 60H3 + 30C1 + 25C2 <= 2500000

1000S1 >= 0

1000S2 >= 0

1000S3 >= 0

1000H1 >= 0

1000H2 >= 0

1000H3 >= 0

1000C1 >= 0

1000C2 >= 0

40S1 >= 100000

50S2 >= 100000

80S3 >= 100000

60H1 >= 100000

45H2 >= 100000

60H3 >= 100000

30C1 >= 100000

25C2 >= 100000

40S1 + 50S2 + 80S3 <= 500000

60H1 + 45H2 +60H3 <= 1000000

30C1 +25C2 <= 1000000