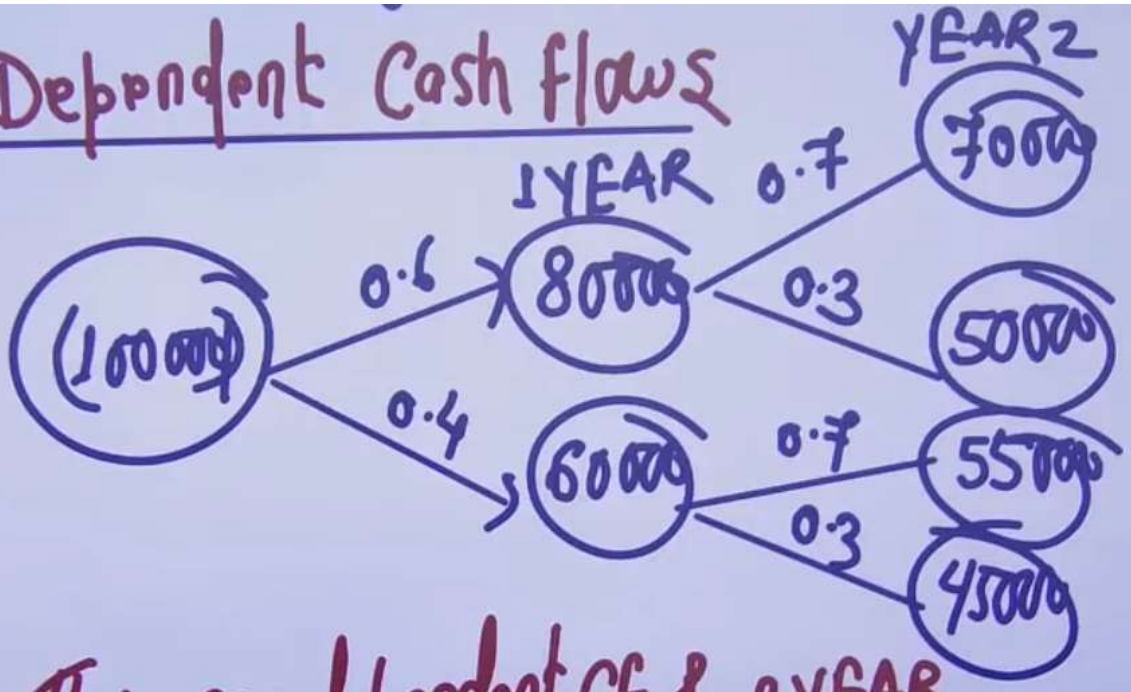
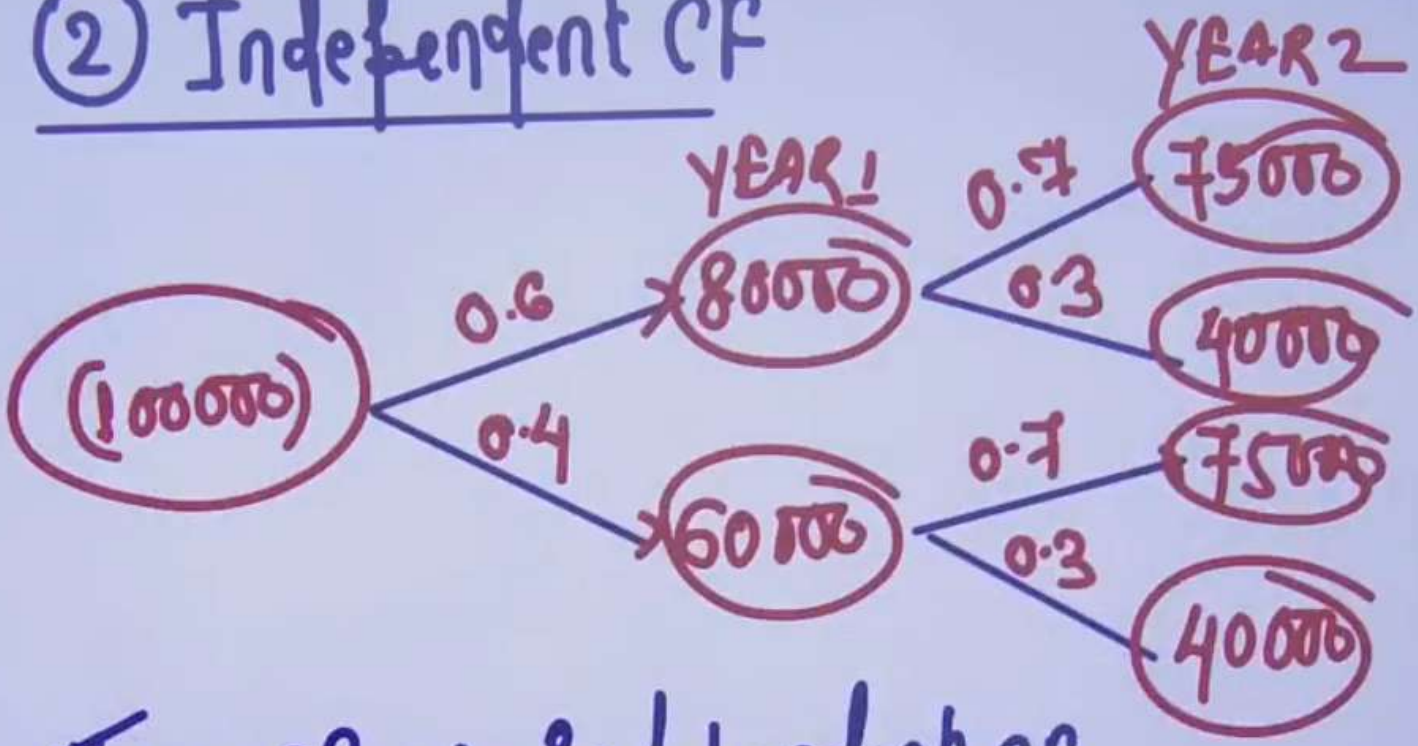
(i) Dependent Cash flows

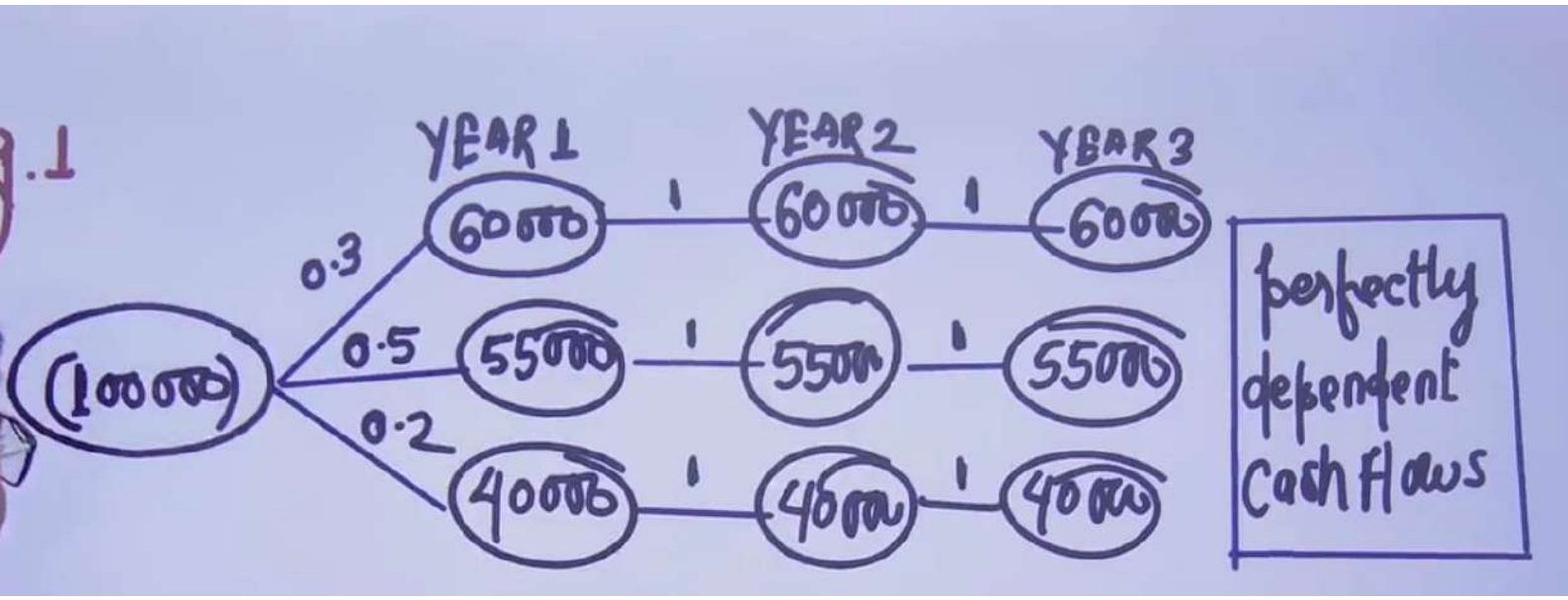


These are dependent CF & 2 YEAR CF depends on 1st YEAR CF

② Independent CF



These CF are independent CF Because 2nd YEAR CF does not depend on 1st YEAR CF.


YEAR 1
YEAR 2
YEAR 3
(100000)
0.3
0.5
0.2
60000
55000
40000
1
1
1
1
1
1
60000
55000
40000
60000
55000
40000
perfectly dependent Cash Flows

Discounting Rate = 10%

① Calculate NPV

② Calculate standard deviation in NPV

① Expected NPV

NPV

Path I = $(60000 \times 2.487) - 100000 = 49220$

Path II = $(55000 \times 2.487) - 100000 = 36785$

Path III = $(40000 \times 2.487) - 100000 = (520)$

Expected NPV = $(49220 \times 0.3) + (36785 \times 0.5) + (-520 \times 0.2) = 33055$

Standard deviation = $\sqrt{(49220 - 33055)^2 0.3 + (36785 - 33055)^2 0.5 + (-520 - 33055)^2 0.2}$

$= 17630$

HERTZ Model

HERTZ model is used to calculate standard deviation in NPV when Cash Flows are perfectly dependent

How to calculate

Standard deviation of CF.

1 YEAR $= \sqrt{(60000-53500)^2 0.3 + (55000-53500)^2 0.5 + (40000-53500)^2 0.2} = 7089$

2 YEAR = 7089

3 YEAR = 7089

FORMULA

$$\sigma NPV = \frac{\sigma CF_1}{(1+r)^1} + \frac{\sigma CF_2}{(1+1)^2} + \frac{\sigma CF_3}{(1+1)^3}$$

$$= \frac{7089}{(1.10)^1} + \frac{7089}{(1.10)^2} + \frac{7089}{(1.10)^3} = 17630$$