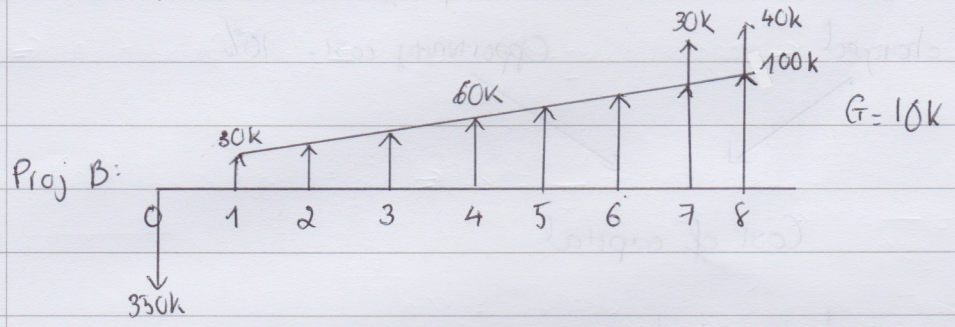


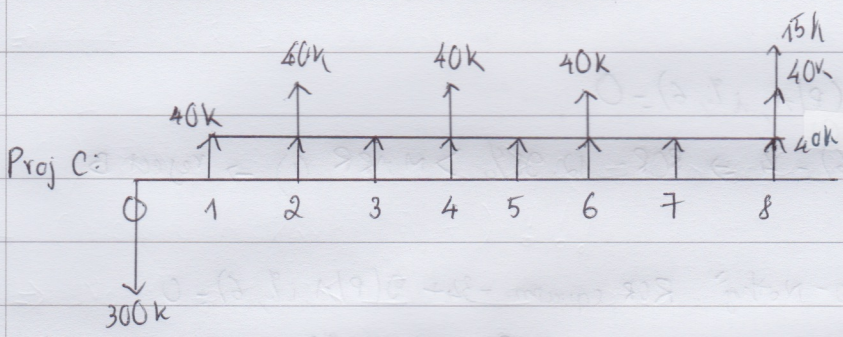
$$AW = -400(A/P, 12\%, 8) + 70 + 10(F/P, 12\%, 4) + 20(F/A, 12\%, 4)(A/F, 12\%, 8)$$

$$= -1.4696K$$



$$AW = -350(A/P, 12\%, 8) + 30 + 10(A/G, 12\%, 8) + [30(F/P, 12\%, 1) + 40](A/F, 12\%, 8)$$

$$= -5.34K$$



$$AW = -300(A/P, 12\%, 8) + 40 + 40(A/F, 12\%, 2) + 15(A/T, 12\%, 8)$$

$$= -0.3K$$

→ Choose Proj C

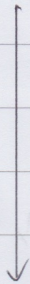
(b) Identify feasible alternatives in 2 steps:

- + Searching for potential alternatives
- + Screening & narrowing down alternatives

Example: look for it in the lecture notes

(c) Debt Financing

- Borrows from outside sources



Interest charged

Equity Financing

- Company's own funds



Opportunity costs

• Opportunity of not using funds for next 'best' investment

Eg: funds can expect to achieve expected ROR of 10% pa if invested elsewhere =

Opportunity cost = 10%

Cost of capital

2/ (a) (i)	A	B	A - B
1st cost	42k	34k	8k
Annual return	11k	9k	2k

$$\text{In ROR: } -8 + 2(P/A, i\%, 6) = 0$$

$$\Rightarrow (P/A, i\%, 6) = 4 \Rightarrow \text{ROR} = 12.98\% > \text{MARR (1)} \rightarrow \text{reject B}$$

Check against "Do-Nothing": ROR equation: $-34 + 9(P/A, i\%, 6) = 0$

$$\rightarrow \text{ROR} = 15.07\% > \text{MARR (2)}$$

\rightarrow reject DN

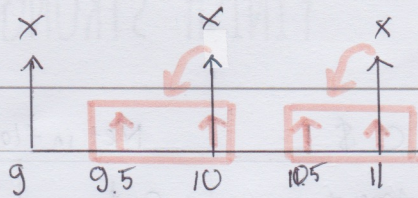
(1), (2) \Rightarrow ~~At~~ Choose Proj A.

(ii) If $\text{MARR} = 16\%$, no project is feasible because it won't generate net worth

(b) Take Year 9 as reference year.

Effective interest rate, i from Yr 9 = $(1 + 2\%)^9 - 1 = 4.04\%$

Worth at year 9 = $2 + \frac{2}{4.04\%}$ (in \$1,000) (1)



equivalent
 The amount that he can withdraw at year 9.5, 10, 10.5... instead of withdrawing at the end of year 10, 11, ... = $X(A/F, 2\%, 2)$

value of all withdrawals at yr 9 = $X(A/F, 2\%, 2)(P/A, 2\%, 18) + X \quad (1)$

(1) = (2) $\Rightarrow 2 + \frac{2}{4.04\%} = X(A/F, 2\%, 2)(P/A, 2\%, 18) + X$

$\Rightarrow X = \$6.4568k \approx \6115.68

3/(a) At 2%, Annual disbursement = \$25 mils

Annual revenue = \$40 mils

PI for cash in flow: $X_r = \frac{(PI)_r + (PI)_{r-1}}{2}$

Market PI, $(PI)_r = (PI)_{r-1} * 1.05$

Year	PI outflow	PI in flow
0	100	100
1	105	102.5
2	110.25	107.63
3	115.76	113.01
4	121.55	118.66
5	127.63	124.59

Sample calculation for yr 1: Disbursement = $25 * 105/100 = C\$26.25$

Revenue = $40 * 102.5/100 = C\$41$

~~✗~~

FINISH STRONG!

(in mils)

Yr	Out flow C \$		In-flow C \$		Net in flow	
	PI	Amount	PI	Amount	C \$	Z \$
0	100	50	100	50	-50	-50
1	105	26.25	102.5	41	14.75	14.048
2	110.25	27.5625	107.63	43.052	15.4895	14.049
3	115.76	28.94	113.01	45.204	16.264	14.050
4	121.55	30.3875	118.66	47.464	17.0767	14.049
5	127.63	31.9075	124.59	49.836	17.9285	14.047
						+10 (SV)

$$\text{Net inflow (Z \$)} = \text{Net inflow (C \$)} \times \frac{(PI)_0}{(PI)_r}$$

$$\begin{aligned} NPV &= -50 + 14.048(P/F, 15\%, 1) + 14.049(P/F, 15\%, 2) + 14.05(P/F, 15\%, 3) \\ &\quad + 14.049(P/F, 15\%, 4) + [14.047 + 10](P/F, 15\%, 5) \\ &\approx 2.066 > 0 \rightarrow \text{Attractive!} \end{aligned}$$

(b) Depreciation, $D = \frac{50 - 10}{5} = \8 mils

$$ITC = 5\% \times 50 = \$2.5 \text{ mils}$$

Yr	PI	N_{bc} (C \$)	D	TI (C \$)	tax (C \$)	N_{ac} (C \$)	N_{az} (Z \$)
0	100	-50				-50	-50
1	105	14.75	8	6.75	-2.7 +2.5 (ITC)	14.55	13.857
2	110.25	15.4895	8	7.4895	-3	12.4895	11.328
3	115.76	16.264	8	8.264	-3.306	12.958	11.194
4	121.55	17.0767	8	9.0767	-3.6307	13.446	11.062
5	127.63	17.9285	8	9.9285	-3.9714	13.9571	10.936
SV							10

$$\begin{aligned} NPV &= -50 + 13.875(P/F, 10\%, 1) + 11.328(P/F, 10\%, 2) + 11.194(P/F, 10\%, 3) \\ &\quad + 11.062(P/F, 10\%, 4) + [10.936 + 10](P/F, 10\%, 5) \\ &= 0.993 > 0 \rightarrow \text{Still attractive} \end{aligned}$$

c) Just need to change year 0 & 1, the rest is the same.

$$\text{ITC} = 2\% \times 50 = \$1 \text{ mil}$$

Yr	PI	N_{bc} (C\$)	D	TI (C\$)	Tax (C\$)	N_{ac} (C\$)	N_{az} (Z\$)
0	100	-50			1	-49	-49
1	105	14.75	8	6.75	-2.7	12.05	11.476

$$\begin{aligned} \text{NPV} &= -49 + 11.476 (\text{PIF}, 10\%, 1) + 11.328 (\text{PIF}, 10\%, 2) + 11.194 (\text{PIF}, 10\%, 3) \\ &\quad + 11.062 (\text{PIF}, 10\%, 4) + [10.936 + 10] (\text{PIF}, 10\%, 5) \\ &= -0.241 < 0 \end{aligned}$$

→ Becomes unattractive!

4) (a) A number of methods of writing off costs of fixed assets are in use. The choice of method is greatly influenced by company policy and the income tax rules prevailing in the country. The 3 methods used most commonly are:

- Straight line depreciation
- SOYD depreciation
- Declining & double-rate declining balance depreciation

Give uniform write off: Straight line depreciation

Give larger depreciation in early years so that can enjoy lower taxable income when the money has more 'values': SOYD, declining and double-rate declining method

Each of the method can refer to the lecture notes.

(b) P/E ratio is ratio of Stock price to Earnings per share (EPS)

If P/E ratio = 12.5, it implies stock is selling at 12.5 times its earnings:

- It takes 12.5 years for investors to recover investment in each share
- And for \$1 earning, investor is willing to pay \$12.5

P/E ratios can be negative, but it is very unlikely that it is ever reported. Although negative P/E ratios are mathematically possible, they generally aren't accepted in the financial community and are considered to be invalid or just not applicable. In the case of the P/E ratio, it is impossible for the numerator to fall below zero because this represents the price of the asset. However, the denominator, which is equal to the earnings of the company, can become negative. EPS values below zero mean that the company is losing money. Negative EPS numbers are usually reported as "not applicable" for quarters in which a company reported a loss. Investors buying a company with a negative P/E should be aware that they are buying a share of a company that has been losing money per share of its stock

The P/E ratio is arguably the most popular fundamental factor used by investors who try to determine the attractiveness of an asset's current value and, more importantly, whether the current price level makes for a good buying opportunity. Generally speaking, a low P/E value suggests that an investor needs to pay a low amount for each dollar of earnings made by the company. This could be used by investors as a sign that the given asset is undervalued and a potentially good investment at current levels. Conversely, a relatively high P/E value is used to suggest that investors will need to pay a high amount for the company's earnings, which can

then be used to suggest that the asset is relatively expensive and that it may be a good idea to wait for a better entry. A high P/E ratio could also suggest that the company is performing well, and the investors have high expectation of the company, so, they are willing to buy it at a higher price.

(c) A preferred stock is a class of ownership in a corporation that has a higher claim on its assets and earnings than common stock. Preferred shares generally have a dividend that must be paid out before dividends to common shareholders, and the shares usually do not carry voting rights. Preferred stock combines features of debt, in that it pays fixed dividends, and equity, in that it has the potential to appreciate in price. The details of each preferred stock depend on the issue. Preferred shareholders have priority over common stockholders when it comes to dividends, which generally yield more than common stock and can be paid monthly or quarterly. If a company is struggling and has to suspend its dividend, preferred shareholders may have the right to receive payment in arrears before the dividend can be resumed for common shareholders. Preferred shareholders have prior claim on a company's assets if it is liquidated, though they remain subordinate to bondholders.

(More info can be found here: <https://www.investopedia.com/terms/p/preferredstock.asp>)

Valuation of preferred stock

D = Annual dividends (constant)

K = Market interest rate

V_p = Market value of preferred stock

$$V_p = \frac{D}{(1+K)^1} + \frac{D}{(1+K)^2} + \dots + \frac{D}{(1+K)^\infty}$$

$$V_p = \frac{D}{K} \quad (P=A/i \text{ for infinite } n)$$

(d) Operating income is an accounting figure that measures the amount of profit realized from a business's operations, after deducting operating expenses such as cost of goods sold (COGS), wages and depreciation. Operating income takes a company's gross income, which is equivalent to revenue minus COGS, and subtracts all operating expenses and depreciation. A business's operating expenses are costs incurred from operating activities and include items such as office supplies, heat and electricity.

Many companies focus on operating income when measuring the operational success of the business. Additionally, it is the measure of the ability of a company to cover costs and make profit. Operating income ratios leaves out interest and taxes, so it does not serve as a net value of the wealth created from a business. More, it is a general tool used to evaluate the operating process and efficiency which ultimately lead to company profits.

Example:

Denali Holding, Inc., the parent company of Dell Technologies, reported its financial results for the first quarter of its fiscal year, ending April 29, 2016. The company saw operating income rise by 37% when compared to the same period in the previous year. The report of the increase in operating income is especially important because the company is looking to merge with EMC, and shareholders are slated to vote on the potential merger on July 19, 2016. While Denali Holding, Inc.'s first quarter sales dropped by 3%, its operating performance could potentially give EMC shareholders confidence in voting to merge the two companies.