Welcome
Today I am ...

A. Ready for some serious learning
B. Enjoying being away from work
C. Hungry, skipped breakfast
D. Loving Tartu
E. Tired, I just want to go home
How many hours did you spend on this course since last lecture?

A. 0-2 hours
B. 2-4 hours
C. 4-6 hours
D. 6-8 hours
E. 8-10 hours
F. More than 10 hours
In this course, I feel

A. I am ahead of the course
B. I am just in line with the course
C. I am a bit behind but it's ok
D. I am behind but I can manage to catch up by myself
E. I am behind and I need help
A. My group is finished
B. My group is on track
C. My group is a bit behind but we can manage
D. My group is putting the hours but we just don’t understand what to do
E. HELP!!!
Qui va vous aider ?
Partenaires clés

Comment le faites-vous ?
Activités clés

Que faites-vous ?
Proposition de valeur

Comment interagissez-vous ?
Relation clients

Qui aidez-vous ?
Segmentation clients

De quoi avez-vous besoin ?
Ressources clés

Comment les atteignez-vous ?
Canaux de distribution

Combien est-ce que ça va coûter ?
Structure des coûts

Combien allez-vous gagner ?
Sources de revenus

http://fr.slideshare.net/faimetti/new-hope-business-model-canvas-for-fun
Software Economics

Introduction to Business Case Analysis
Objectives

- Know what a Business Case is and being able to do a basic Business Case Analysis
- Be able to calculate, use, understand and reason about measures (NPV, ROI, IRR etc.) used for investment calculations.
Introduction to Business Case Analysis
- What is a business case?
- Why is it important/useful?

Basic Concepts of Business Case Analysis
- Principles of Business Case Analysis
- Benefits
- Time Value and NPV

Business Case Set Up – Step by Step
- Selver Case Study
Structure

- Basic Measurements for Business Case Analysis Part 1
  - ROI, IRR, Payback Period
  - Sangar Case Study

- Basic Measurements for Business Case Analysis Part 2
  - Recap, Examples of cases
  - Spotify Case Study

- Funding and TCO
  - Pricings models for software (consumer perspective)
  - TCO
  - Funding IT
What is a Business Case?

A type of **decision-making tool** used to determine the effects a particular decision will have on **profitability**.

A business case should show how the decision will alter cash flows over a period of time, and how costs and revenue will change.

http://www.businessdictionary.com/definition/business-case.html
What is a Business Case?

A business case covers the Information needed for decision makers to show that an idea being considered makes financial sense.
15 minutes, in groups of 3-4 persons.

Scenario: You are the general manager of a software development company. Your company’s profit is decreasing due to ongoing recession.

1. How can you improve your profit? Give 3 suggestions on how this can be done.
2. How much would your profit improve with each of the 3 suggestions (make assumptions)?
3. How much would it cost to implement your suggestions?
Exercise

- Due to lack of financial means and resources, you can only implement one of the suggestions.

- Which one will you choose and why?

- How would you argue for your case?
Why is Business Case Analysis Important?

1. It costs money and takes people to make investments (in our setting, IT investments).
2. There is a limit to the availability of financial and human resources.
3. Therefore we need to choose wisely what we invest in.
4. Business Case Analysis gives us the information that will help us make more wise decisions and choices.
5. Measurements gives us an effective tool to compare different cases against each other.
Software Economics

Basic Concepts of Business Case Analysis
Business Case Principles

- There are quantifiable (tangible) and qualitative (intangible) factors (benefits, gains) associated with investments.

- All investments (money) have time value.

- There is always an alternative to the investment (at least to do nothing) – Opportunity Cost.

- There is always a risk with investments, so we want to be compensated for this risk.
Structure of Benefits

Higher Profitability

- Higher Revenues
  - New Markets
  - Better Customer Service
  - New Products
  - ?

- Lower Costs
  - Better IT support
  - Higher Efficiency
  - ?
Tangible Benefits

Tangible benefits

- Easier to measure, more “measurable”
- Revenue changes, Profit Margins, Cost Reductions etc.
- Can use NPV, ROI etc. to measure and compare.
Benefits over time

Revenue & Profit

Revenue Before

Revenue After
Intangible Benefits

Harder to measure (but it is possible), strategic value such as:

- **Brand Advantage** – no direct sales increase or hard to measure but increased perceived value of corporate brand (sponsoring events)
- **Strategic Advantage** – important for corporate objective (acquisition of other companies)
- **Intellectual Capital** – increasing access to and knowledge of staff (data warehouse, business intelligence)
- **Organizational Advantage** – increasing organizational efficiency (instant messaging, mobile computing)
- **Risk Avoidance** – preventing harmful things (back up solutions, security)
- **Mandatory** – investments that are a must (governmental regulations and compliance)
Tangible vs. Intangible

Benefits

Tangible
- Increased Revenues
- Cost Savings
- Productivity Gain
- Process Improvement

Intangible
- Better User Experience
- Higher Customer Satisfaction
- Increased Compliance
- Better Brand Image

October 20, 2016
Introduction to financial terms

- **Sales / Revenue / Turnover (UK)**
  - Cost of Sales / Cost of Revenue / Cost of Goods Sold (COGS)

- **Gross Profit (€) or Gross Margin (%)**
  - Operating Expenses

- **Operating Income or Loss**

- **Financial Income and Expenses**

- **Net Profit**
### Income Statement Example

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Period Ending</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td>48,017,000</td>
<td>46,542,000</td>
<td>35,119,000</td>
</tr>
<tr>
<td><strong>Cost of Revenue</strong></td>
<td>19,053,000</td>
<td>18,215,000</td>
<td>12,693,000</td>
</tr>
<tr>
<td><strong>Gross Profit</strong></td>
<td>28,964,000</td>
<td>28,327,000</td>
<td>22,426,000</td>
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</tbody>
</table>

#### Operating Expenses

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Development</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Selling General and Administrative</td>
<td>18,185,000</td>
<td>18,154,000</td>
<td>14,013,000</td>
</tr>
<tr>
<td>Non Recurring</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Others</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total Operating Expenses</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Operating Income or Loss

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating Income or Loss</strong></td>
<td>10,779,000</td>
<td>10,173,000</td>
<td>8,413,000</td>
</tr>
</tbody>
</table>
## Income Statement Example

<table>
<thead>
<tr>
<th>Operating Income or Loss</th>
<th>10,779,000</th>
<th>10,173,000</th>
<th>8,413,000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Income from Continuing Operations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Other Income/Expenses Net</td>
<td>608,000</td>
<td>1,012,000</td>
<td>5,502,000</td>
</tr>
<tr>
<td>Earnings Before Interest And Taxes</td>
<td>12,206,000</td>
<td>11,875,000</td>
<td>14,940,000</td>
</tr>
<tr>
<td>Interest Expense</td>
<td>397,000</td>
<td>417,000</td>
<td>733,000</td>
</tr>
<tr>
<td>Income Before Tax</td>
<td>11,809,000</td>
<td>11,458,000</td>
<td>14,207,000</td>
</tr>
<tr>
<td>Income Tax Expense</td>
<td>2,723,000</td>
<td>2,812,000</td>
<td>2,370,000</td>
</tr>
<tr>
<td>Minority Interest</td>
<td>(67,000)</td>
<td>(62,000)</td>
<td>(50,000)</td>
</tr>
<tr>
<td><strong>Net Income From Continuing Ops</strong></td>
<td>9,838,000</td>
<td>9,274,000</td>
<td>12,812,000</td>
</tr>
<tr>
<td><strong>Non-recurring Events</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discontinued Operations</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Extraordinary Items</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Effect Of Accounting Changes</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Other Items</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Net Income</strong></td>
<td>9,019,000</td>
<td>8,584,000</td>
<td>11,787,000</td>
</tr>
<tr>
<td>Preferred Stock And Other Adjustments</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Net Income Applicable To Common Shares</strong></td>
<td>9,019,000</td>
<td>8,584,000</td>
<td>11,787,000</td>
</tr>
</tbody>
</table>
## Consolidated Statements of Earnings

For the years ended September 30  
(in thousands of Canadian dollars, except share data)

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue</strong></td>
<td>4,772,454</td>
<td>4,223,942</td>
</tr>
<tr>
<td><strong>Operating expenses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costs of services, selling and administrative (Note 19)</td>
<td>4,226,859</td>
<td>3,690,960</td>
</tr>
<tr>
<td>Acquisition-related and integration costs (Note 24)</td>
<td>254,973</td>
<td>3,675</td>
</tr>
<tr>
<td>Finance costs (Note 21)</td>
<td>42,099</td>
<td>19,395</td>
</tr>
<tr>
<td>Finance income</td>
<td>(5,318)</td>
<td>(3,552)</td>
</tr>
<tr>
<td>Other income</td>
<td>(3,955)</td>
<td>(7,647)</td>
</tr>
<tr>
<td>Foreign exchange gain</td>
<td>(1,134)</td>
<td>(3,365)</td>
</tr>
<tr>
<td>Share of profit on joint venture</td>
<td>(3,996)</td>
<td>(13,359)</td>
</tr>
<tr>
<td><strong>Earnings before income taxes</strong></td>
<td>4,509,528</td>
<td>3,686,107</td>
</tr>
<tr>
<td><strong>Income tax expense (Note 23)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earnings before income taxes</td>
<td>262,926</td>
<td>537,835</td>
</tr>
<tr>
<td>Income tax expense</td>
<td>131,397</td>
<td>99,696</td>
</tr>
<tr>
<td><strong>Net earnings</strong></td>
<td>131,529</td>
<td>438,139</td>
</tr>
</tbody>
</table>
## Types of Costs

### NOTE 19

Costs of services, selling and administrative

<table>
<thead>
<tr>
<th>Year ended September 30</th>
<th>2012</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>$</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>Salaries and other member costs $</td>
<td>2,771,802</td>
<td>2,343,015</td>
</tr>
<tr>
<td>Hardware, software and data center related costs</td>
<td>400,015</td>
<td>457,248</td>
</tr>
<tr>
<td>Professional fees and other contracted labour</td>
<td>592,374</td>
<td>494,292</td>
</tr>
<tr>
<td>Property costs</td>
<td>204,944</td>
<td>170,859</td>
</tr>
<tr>
<td>Amortization and depreciation (Note 20)</td>
<td>220,054</td>
<td>210,450</td>
</tr>
<tr>
<td>Other operating expenses</td>
<td>37,670</td>
<td>15,096</td>
</tr>
</tbody>
</table>

| Total | 4,226,859 | 3,690,960 |

¹ Net of tax credits of $98,750,000 in 2012 ($111,832,000 in 2011).
Income Statements

Search for Income Statements of two different companies.
(in groups of 3-4, 10 minutes)

Answer these questions

- In which countries do they have their HQ?
- In which industries are they operating (airline, hotel, technology, consulting etc.)
- What terms do they use in their income statements?
We found

A. Revenue 74%
B. Sales 6%
C. Turnover 9%
D. Other term 11%
We found

A. Cost of Revenue
B. Cost of Sales
C. Cost of Goods Sold
D. Other
Time Value of Money

Time Value of Money (TVM) is the concept that, given that money can earn interest, money is worth more the sooner it is received.

Why? – because of its potential earning capacity.

If you have 10 000 € today that can earn interest (say 2%), it is worth more to have that money in your pocket today than it is to receive it in one year from now.
Future Value

Future Value: What is the value of a given sum of money in the future? What does the value depend on?

Future value = present value x (1 x interest rate)^number of periods

\[ FV = PV \times (1+i)^n \]

i = risk free rate

n = years

October 20, 2016
Interest rate is given on both the nominal and the interest rates received.

\[ FV = N \left(1 + \frac{i}{n}\right)^{nt} \]

- **FV** = Future value
- **N** = Nominal amount
- **i** = annual nominal interest rate (not considering the compounding)
- **n** = number of times the interest is compounded per year
- **t** = number of years
Example

You have developed a software and you have two options how you wish to be paid.

**Option A:** Receive 15 000 € now.

**Option B:** The client says that if you can wait until they get better cash flow, they will pay you 16 000 € one year from now.

You think you can get a savings account that will give you an interest rate of 3 %.

**From a strictly financial point of view, would you choose option A or B?**
I choose (based on financial aspect only)

A. A (15 000 today)

B. B (16 000 later)
Future Value of 15 000 € is

\[ 15 000 \text{ €} \times (1+0.03)^1 = 15 450 \text{ €} \]

\[ 15 450 \text{ €} < 16 000 \text{ €} \]
Present Value

Present Value: What is the value of a future sum of money today?

Just reverse the future value formula. \( FV = PV \times (1+i)^n \)

\[
PV = \frac{FV}{(1+i)^n}
\]

\( i \) = risk free rate

\( n \) = years

But what do we do when we have several future values spread over several years?
Net Present Value

Same as PV but sum of PV for each year.

<table>
<thead>
<tr>
<th>Rate</th>
<th>Year</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td></td>
<td>10,000</td>
<td>10,000</td>
<td>10,000</td>
<td>10,000</td>
<td>10,000</td>
</tr>
</tbody>
</table>

Sum of PVs

Year 0: 10,000
Year 1: 9,524
Year 2: 9,070
Year 3: 8,638
Year 4: 8,227

Total PVs: 45,460
Discount Rate

Its simply the rate you use (the $i$ ) to determine the net present value of future cash flows.

- It is the rate you use to convert the future cash flows into their present value.
- The discount rate should reflect the “riskiness” of the investment.
- It should also be greater than the cost of the capital used for the investment but we will return to this point later.

Also called “rate of return” or “hurdle rate”
NPV formula

\[ \text{NPV} = \sum_{n=0}^{N} \frac{\text{Net Cash Flow}_n}{(1+i)^n} \]

- Net Cash Flow for each year (Cash in – Cash out)
- \( i \) = discount rate
- \( N \) = total number of years
Timing of Cash Flows

- Initial or Upfront Investment
- Annual Revenues or Savings
- Annual Costs
- Possible final value
- Possible final cost

Cash Inflow

Cash Outflow

Year 0 | Year 1 | Year 2 | Year 3 | Year n
Exercise (20 minutes) in groups of 3-4

Upgrade from Windows 7 to Windows 10 or not?

- One time investment cost (license, manpower, etc.):
  - 2000 PCs
  - License is 150 $ per PC (year 0)
  - Installation: 25 $ per PC (year 0)

- Yearly maintenance cost: 50 000$ (starting year 1)

- Yearly benefit: 150 000$ (starting year 1)

- Years to next upgrade: 4 (next upgrade starts beginning of year 5)

- Rate of return: 8%

- What is the NPV and is it a good investment?
This is a good investment

A. Yes, the NPV is positive

B. This investment does not add or take away any value so its either way

C. No, the NPV is negative
## Solution

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Installation Cost</strong></td>
<td>50000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>License Cost</strong></td>
<td>300000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maintenance Cost</strong></td>
<td>50000</td>
<td>50000</td>
<td>50000</td>
<td>50000</td>
<td>50000</td>
</tr>
<tr>
<td><strong>Total Costs</strong></td>
<td>350000</td>
<td>50000</td>
<td>50000</td>
<td>50000</td>
<td>50000</td>
</tr>
<tr>
<td><strong>Benefit</strong></td>
<td>150000</td>
<td>150000</td>
<td>150000</td>
<td>150000</td>
<td>150000</td>
</tr>
<tr>
<td><strong>Net Cash Flow</strong></td>
<td>-350000</td>
<td>100000</td>
<td>100000</td>
<td>100000</td>
<td>100000</td>
</tr>
</tbody>
</table>

**Rate of return** 8%

**NPV** $(€18,787.32)$ *Be careful not to include Year 0 in Excel NPV function*

**Manual NPV calculation**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV</td>
<td>-350000</td>
<td>92592.59</td>
<td>85733.88</td>
<td>79383.22</td>
</tr>
<tr>
<td>Sum of PVs</td>
<td>-18787.316</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Interpreting NPV

- A positive NPV means the cash inflows are greater than the cash outflows when they are discounted to their present value. The investment adds value, you get more money than you invested.

- A negative NPV means that cash inflows are less than the cash outflows when discounted to their present value. The investment results in you having less money.

- A NPV at zero means that no value is added or subtracted to your investment.
Summary

- What are some basic business case principles?

- Business Case Tools
  - What is Future Value?
  - What is Present Value?
  - What is NPV (Net Present Value)?
  - How do we interpret NPV?
Software Economics

Business Case Analysis Calculation – Set up
<table>
<thead>
<tr>
<th>Investment Scenario</th>
<th>Initial</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Demand</td>
<td>1 000</td>
<td>1 000</td>
<td>1 000</td>
<td>1 000</td>
<td>1 000</td>
<td></td>
</tr>
<tr>
<td>Market Penetration</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sold units</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenues Standard</td>
<td>100 000</td>
<td>100 000</td>
<td>100 000</td>
<td>100 000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenue Extra package</td>
<td>3 000</td>
<td>3 000</td>
<td>3 000</td>
<td>3 000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenues Sold Planes</td>
<td>103 000</td>
<td>103 000</td>
<td>103 000</td>
<td>103 000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Revenues</td>
<td>3 708</td>
<td>3 708</td>
<td>3 708</td>
<td>3 708</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Revenues</strong></td>
<td>106 708</td>
<td>106 708</td>
<td>106 708</td>
<td>106 708</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Revenues</strong></td>
<td>106 708</td>
<td>106 708</td>
<td>106 708</td>
<td>106 708</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COGS Planes</td>
<td>30 000</td>
<td>30 000</td>
<td>30 000</td>
<td>30 000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COGS Extra Package</td>
<td>1 500</td>
<td>1 500</td>
<td>1 500</td>
<td>1 500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COGS Service</td>
<td>2 225</td>
<td>2 225</td>
<td>2 225</td>
<td>2 225</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marketing</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Costs</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Costs</strong></td>
<td>34 725</td>
<td>34 725</td>
<td>34 725</td>
<td>34 725</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Profit</strong></td>
<td>71 983</td>
<td>71 983</td>
<td>71 983</td>
<td>71 983</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D</td>
<td>10 000</td>
<td>9 000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pilot plane</td>
<td>15 000</td>
<td>25 000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tests</td>
<td>5 000</td>
<td>15 000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infrastructure</td>
<td>20 000</td>
<td>15 000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Annual Costs</strong></td>
<td>5 000</td>
<td>5 000</td>
<td>5 000</td>
<td>5 000</td>
<td>5 000</td>
<td></td>
</tr>
<tr>
<td><strong>Total Investment Cost</strong></td>
<td>50 000</td>
<td>64 000</td>
<td>5 000</td>
<td>5 000</td>
<td>5 000</td>
<td>5 000</td>
</tr>
<tr>
<td><strong>Cash Flow Invest</strong></td>
<td>-50 000</td>
<td>-64 000</td>
<td>66 983</td>
<td>66 983</td>
<td>66 983</td>
<td>66 983</td>
</tr>
<tr>
<td><strong>Incremental Cash Flow</strong></td>
<td>-50 000</td>
<td>-114 000</td>
<td>-47 017</td>
<td>19 966</td>
<td>86 950</td>
<td>153 933</td>
</tr>
</tbody>
</table>

NPV: 25 350
IRR: 36%
ROI: 115%
Payback: 2017
1. Read the text so you get the whole view and what is asked – understand what is the investment project, why it is being considered and so on.

2. Gather the data and cluster them according to
   • Data (numbers) concerning the investment in general
   • Data (numbers) concerning the benefits / gains /profit expected from the investment
   • Data (numbers) concerning the costs of the investment
Step by Step ..

✓ Set up the structure of your calculations
  • Set up all the numbers with explanations
  • Begin with the years (including year 0)

Year 0 or Upfront is the costs you will have today and is therefore not discounted. For simplicity we assume that its all costs until 31st of December regardless of when it is, as long as it is in this year.
Step by Step ..

- Begin with looking at the data (numbers) concerning the benefits / gains /profit.

- For each year, calculate the benefits / gains /profit.
## Step by Step ...

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Savings from cashier</td>
<td>150 000</td>
<td>300 000</td>
<td>450 000</td>
<td>450 000</td>
<td>450 000</td>
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<tr>
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<td>210 000</td>
<td>315 000</td>
<td>315 000</td>
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<tr>
<td>Handling fee</td>
<td>175 000</td>
<td>350 000</td>
<td>525 000</td>
<td>525 000</td>
<td>525 000</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>430 000</strong></td>
<td><strong>860 000</strong></td>
<td><strong>1 290 000</strong></td>
<td><strong>1 290 000</strong></td>
<td><strong>1 290 000</strong></td>
<td></td>
</tr>
</tbody>
</table>
Then we move on to the costs (the money we have to spend to make the investment). We have two types of costs.

- Costs that are one-time investments
- Costs that are occurring with some regularity to maintain the investment

Calculate the net cash flow for each year.
## Step by Step

<table>
<thead>
<tr>
<th>Year</th>
<th>0</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
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<td>300000</td>
<td>450000</td>
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<tr>
<td>Purchases</td>
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<td>210000</td>
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<tr>
<td>Handling fee</td>
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<td>350000</td>
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<td>525000</td>
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<tr>
<td><strong>Total</strong></td>
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<td>860000</td>
<td>129000</td>
<td>129000</td>
<td>129000</td>
<td></td>
</tr>
<tr>
<td>Picup bay</td>
<td>200000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>Maintenance of picup bay</td>
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<td>20000</td>
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<td>20000</td>
<td>20000</td>
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<td>Software maintenance</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
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<td>630000</td>
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<tr>
<td><strong>Cash flow</strong></td>
<td>-350000</td>
<td>20000</td>
<td>200000</td>
<td>660000</td>
<td>660000</td>
<td>660000</td>
</tr>
</tbody>
</table>
Now we have incremental cash flow for each year, i.e., we know how much more (or less) the net of the revenues and costs are per year.

What is the discount rate?

Calculate NPV
  - Use excel function or google sheet function
  - Discount each year separately and then sum them up
<table>
<thead>
<tr>
<th></th>
<th>Cash flow</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-350 000</td>
<td>20 000</td>
<td>200 000</td>
<td>660 000</td>
<td>660 000</td>
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<td>Discounted cashflow</td>
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<td>128 000</td>
<td>337 920</td>
<td>270 336</td>
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<tr>
<td>NPV</td>
<td>618 525</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
A. Way to complicated
B. Ok, I get it, I need to repeat it but I think I understand
C. I did not get it all but I will manage when I repeat it at home
D. Appi, APPI, vajan abi
The tempo of today’s lecture was ...

A. Way to fast for me
B. Just right for me
C. A bit to slow for me
D. Way to slow, I was daydreaming
The materials (slides) were ...

A. Easy to follow and understand
B. Just about right
C. I was a bit lost a few times
D. I was a bit lost many times
E. Mis asja, kas see on abstraktne kunst?
Thank you.