Admin notes:

- Sign in
- Subjects for a missing class report?
  Questions?
Reports

Write an initial statement on the issue you are addressing. Having it written down will help you focus.

Then make a list of one or more candidate documents. You could Google for likely documents and use the attached to the CS207 wiki page. Read the ones that seem significant. Write a one or two paragraph summary, with citations [Author: title; publication, [vol.no.], date, page numbers].

Make notes of their assumptions and results, be critical. This is your contribution!

Folk that advocate a specific point-of-view often forget or ignore important factors.

Add a brief conclusion.
Relate to your initial the intro.
The conclusion will tell me -- and the world on the web -- what you have learned.

The value of your work is the clarity of your point. Don’t worry about the length; it is harder to be brief than voluble.
1. Why should software be valued?
2. Open source software. Scope. Theory and reality
4. Market value of software companies.
5. Alternate business models.
7. Life and lag of software innovation.
8. Sales expectations and discounting.
9. The role of patents, copyrights, and trade secrets.
10. Licensing.
11. Separation of use rights from the property itself.
12. Risks when outsourcing and offshoring development.
13. Effects of using taxhavens to house IP.
Growth and Perception

E-commerce [this slide based on a 2001 CS99/73N class exercise]

- Gartner: 2000 prediction for 2004: 7.3 T$
- Revision: 2001 prediction for 2004: 5.9 T$ drastic loss?

Examples
- Artificial Intelligence
- Databases
- Neural networks
- E-commerce

Perception level

Invisible growth

Extrapolated growth

Disapointment

Perceived growth

Perceived initial growth

50 companies, each after 20% of the market

Realistic growth

Failures
Trends 1998 : 1999

- Users of the Internet 40% → 52% of U.S. population
- Growth of Net Sites (now 2.2M public sites with 288M pages)
- Expected growth in E-commerce by Internet users [BW, 6 Sep.1999]

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An unsustainable trend cannot be sustained [Herbert Stein, Council Econ. Adv, 1974]

⇒ new services
Example revisited

Software product

- Sells for $500/copy
- Market size 200 000
- Market penetration 25%
  - Expected sales 50 000
  - Expected income $25M
  - Discounted gross income $14.7M
  - Available for SW maintenance $3.7M

Ok but see when it is needed
Combining it all
and adjusted for end-of-life

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<td></td>
<td></td>
<td></td>
<td>out of $14,771 discounted sales</td>
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Result of Example

- Selling 50,000 SW units at $500 \approx $1M
  
  not $25M

Once its in a spreadsheet, the effect of the many assumptions made can be checked.

When assumptions later prove unwarranted then management can make corrections.

To be wise, don't spend more than \approx $500,000 to develop the software product.
Transients due to versions

Customer behavior w.r.t. new versions, superimposed on basic sales curve

Overall steady state sales

New version announced

New version release

New version announced

2-year version life
Income Factors

1. Business overhead takes 50% of net revenue
   - An average, when sales are low, fraction is higher
   - Be lean, especially when sales fall
   - Focus on on-line sales

2. Marketing uses 25% of net revenue
   - Assess customer base, but don’t skimp here

3. Available for maintenance is still 25% of net
   - Enough once sales become substantial
   - Requires initially additional capital
Guidance obtained

- We applied an overall Erlang sales curve
  - new versions keep market going but customers do not replace earlier versions
- The assumption are sufficiently simple that alternatives can be intelligently discussed
  1. keep development costs low
  2. design so that SW maintenance is low
  3. charge a higher price
  4. minimize sales cost, without reducing market size
  5. broaden the market
  6. or →
Business models

0. New versions do not replace earlier versions

Alternative business models

1. New versions encourage replacement

2. Provide related services

3. Charge for maintenance
   - Lower initial cost, slower income stream

4. Make product Open source to broaden market
   - Charge only for services
Alternate business model

Consider maintenance and its income

"Service model"

• More assumptions — now include cost @50% of value

1. Original cost $500 000 (used to estimate 2.)
   a. Maintenance cost 15%/year of aggregate original cost
   b. Maintenance fee 15%/year of original price, 1 year delay.
   c. 85% annual retention of customers.

2. Maintenance Lag = $\Delta (t \text{ cost}, t \text{ income}) = 1 \text{ year}$

3. Stop maintenance when cost > income
## Additional Effect of service model

### Table

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<th>y2</th>
<th>y3</th>
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<td>Total</td>
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<td>≈ $4.3 million</td>
<td>&gt;&gt; sales only</td>
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Cost of maintenance = 1523/(500+1523) = 75% of total
Lag delays benefits of R&D investments

Gestation period

Ongoing Development
(5% increase in personnel)

Mature company

Simple Model

Startup

Development

Testing

Research

Growth limit

Effort

Estimate effective lag

~37%

~14%

@27.4%

35%

25%

50%

75%

done

start
Service model factors

• Same proportion was used for SW contribution: 25%
  ➢ Maintenance income has lower sales cost, perhaps more should be made available for software improvements

• Discount total only after maintenance cost
  ➢ Income comes at time of spending

• Maintenance fees still generate substantial income
  ➢ Organize business sector to collect those in out years
  ➢ Use excess SW income for replacement or new products

• Continue longer, but stop in time!
  ➢ When maintenance costs more than income
More years of service model?

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Less, out year losses because $5687M spent on maintenance

Good time to quit

But still have income to v12

Quit: reduce expense & income 1/3 each year

10/22/2012 Gio: CS207 Fall 2012
Total income vs technical cost
Net income, after sales cost

End of profit on sales

End of profit on all income
Life of Software

We learned now why software has a finite life
Although SW can be indefinitely maintained

*Eventually the maintenance costs exceed income*

• A very well-selling product can have a long life
  1. Unique
  2. High quality
  3. Well maintained

• An easy to maintain product can have a long life
  1. Well designed
  2. Insulated from change by established standards
Companies that

1. develop & sell software  →  *
   • Basis of IP: income from sales

2. purchase & license software for internal use
   • Do not generate IP with software

3. develop software internally for their own use
   • Basis of IP: relative SW expense × all income

4. combinations
Allocaction

• When there are multiple products
• When there are other contributors to income
  ➢ Substantial hardware
  ➢ Financial consultants in financial firms
  ➢ Experts in call centers
  ➢ Brand name

Not all of the income can be allocated to the software

• Pareto Optimum
Pareto Optimality
(not Pareto Efficiency : 80/20 rule)

The point were any change lowers the total benefit/cost

• Spending more on software will have less benefit than spending on other stuff
  ➢ People
  ➢ Hardware
  ➢ Advertising
    ▪ For large 10 IT companies the average value allocated to their brand name is 22% (BW survey).

Conclusion:

• If a company is managed optimally, we can allocate IP contribution by multi-year spending patterns
Setting License fees

Say you want to delegate sales in Europe to some company EUsales that can do it easier over there

- How do you set the fees or royalties?
  
  1. You have computed a value of your SW of $1M
     - But without discounting, it is actually $1.6M = Σ(due old, slide 5)
     - You will also maintain the SW 1.36M = Σ(maintenance cost, slide 12)

     The total due is $3M

  2. You expect the European sales will be 40% of total, 20 000
     - The reason for not discounting is that funds arrive at the same times.

- To earn the same you should charge $150/unit
  
  - It does not matter how EUsales sells it and what it charges
  - Complexities are required language, interface improvements
Discussion

• Many parameters used to estimate IP
  ➢ Uncertainty!
  ➢ But better than not knowing what’s going on.
• Many choices now
  a. Technical options
  b. Business options
Interact with each other.