Incept5

How to make your first (£€$) million

***John Davies** - CTO Incept5*

***Aarhus/Århus** - 3rd October 2012*

@jtdavies

We have 15 minutes

I figured 10 minutes talking and 5 minutes for questions

Incept5

Who wants €£$ 1 million?

- Why would you want so much money?

- You can work in an office for 40 years, pay into your pension, pay off your house and send the children to a good university

- When you retire you can buy a second-hand sports car and take a nice cruise around the Caribbean

- That's not for me!

Incept5

Making Money for yourself

- There are a few ways...

- Consulting
  - Nice rates but you end up being a slave to your financial needs
  - You daren't take vacation as missed days cost too much
  - As you get older you have to think about health, a month off for an illness could be expensive
  - Even if you put 20,000 away every year you'll only have 400,000 after 20 years
  - If you put 50,000 away every year you might make it but you'll have no time to enjoy you money

Incept5

- Writing software
  - Good but how are you going to sell and market it?
  - People don't like paying for software these days
  - A booth at a show like this costs 10-15,000
  - Even a cool iPhone app is lost in the hundreds of thousands already out there

- Perhaps a Venture Capitalist (VC) can help?
  - This seems to be the American way
  - Come up with an idea, persuade the VC that it's going to make him rich and they give you 500,000 to get started
  - Come back for the next round and you get millions
  - Cool!!!

Incept5

VCs

- The problem with VCs are that take your share holding
- Start too early and you lose control of your company, they put in a CEO, a SFO and a president
  - You get to be the CTO

- The CEO decide you need to grow aggressively and need more money
  - The only way to get more money is to further reduce your shareholding - again

- Eventually, some 5-10 years later you sell for 35 million
  - But only own 3% of the company which is further vested in your acquiring company and you become a project manager

Incept5

Partners

- Find some friends, people you trust
- Write a “shareholders agreement” and work towards a common goal - your first million (each)
  - It helps if you can each put some money into the startup - working capital
- Two is not a good number for a partnership, it rarely works
  - Three to 5 is far better
- Ideally you need complimentary skills, not just geeks
  - Ideas, business skills, management, delivery

Incept5

You need ideas

- Start with a few ideas
- Allow your partners to shoot them down
  - Agree on a few and run with some of them for a few weeks/months
  - When the ideas "stick" go with it but be prepared to kill it if it doesn't work later
- Remember you're running a business, watch the money not how cool it is
  - Building a new Scala widget for Eclipse is great but how will you persuade people to part with their hard-earned money for it?

Incept5

Do the maths

- If you want a million when you sell then the maths is simple
  - E.g. 4 partners, 25% each
  - Leave another 20 or percent for employees - so 20% each
  - Work out the tax (about 10% for entrepreneurs in the UK)

$$C * \left(\text{Average} * \left(\frac{P}{NPP} * NPO * \frac{1}{(1+Rf)^{tf}} \right) \right) \left(\frac{}{S} \right)$$

- So you need to sell your company for about 5.6 million
  - If you're a product company with recurring revenue and sales increasing year by year then you can look at an "EBITDA multiplier" of around 4.5, it can vary from 2 to about 10 if you're very lucky
  - Services companies are lucky to get "1", i.e. their yearly revenue

- So aim to get your revenues to around 1.25 million yearly and you're ready so sell

Incept5

Keep going!

- We killed out first product idea (a BPM monitor) after a million of our own investment (from a previous acquisition) and 2 years of hard work
  - People really liked it but no one wanted to pay for it
- We came up with a new idea and people paid money for it
  - So that became our new focus
- We went through difficult times
  - Sold our houses, took jobs elsewhere to pay for food, took out ridiculous loans, ran up credit cards, split up with partners
- It was tough, really tough but we believed in the idea

Incept5

Believe in yourself!

- After 7 years, not a single day sick, no vacation we sold
  - And made our first millions

- Would I do it again? We already did!
  - And we bought back the previous company last year

- Most important...
  - Stick to agreements - but make sure your agreements allow for people to leave - you leave, you lose
  - Don't burn bridges - relationships are the most important asset
  - Family first - get buy-in from your partner otherwise you're on your own, literally
  - Believe in yourself and your partners

Incept5

Any questions?

Incept5

From zero to a Hello World app on the iPhone

John Davies - CTO Incept5

Aarhus/Århus - 3rd October 2012

@jtdavies

goto; conference aarhus

MYSTERIES OF FLOATING POINT

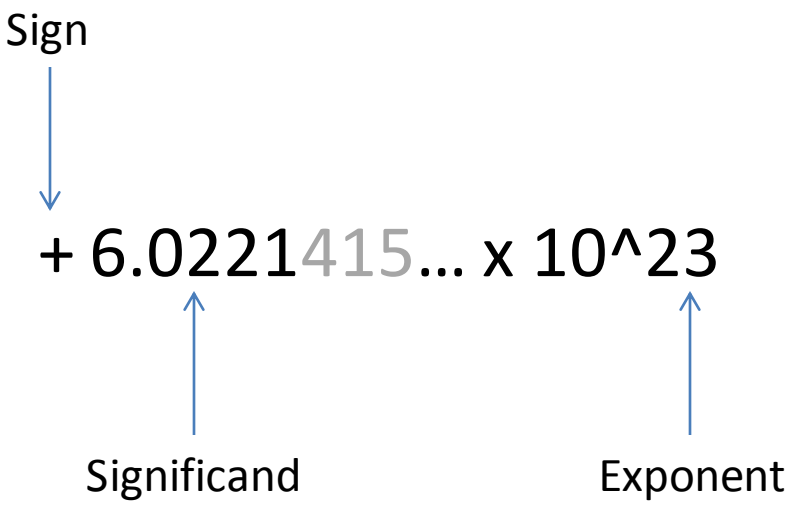
John D. Cook

M. D. Anderson Cancer Center

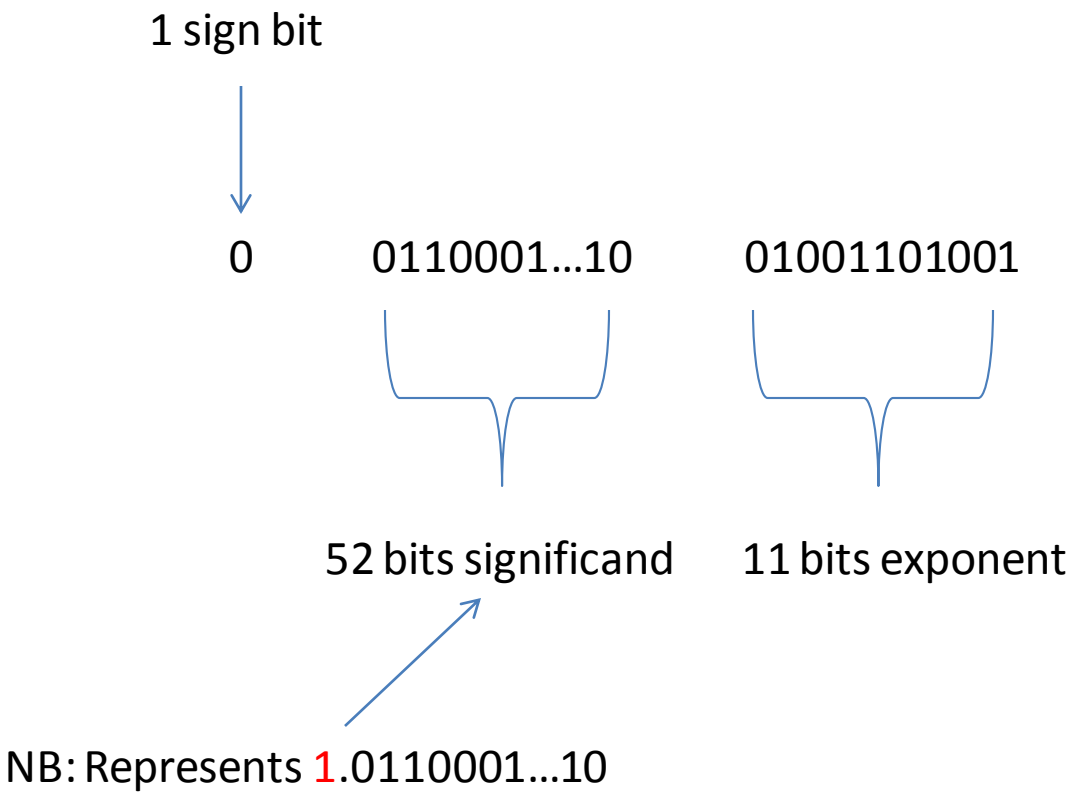
INTERNATIONAL SOFTWARE DEVELOPMENT CONFERENCE

gotocon.com

Base 10 example



Standard 64-bit numbers



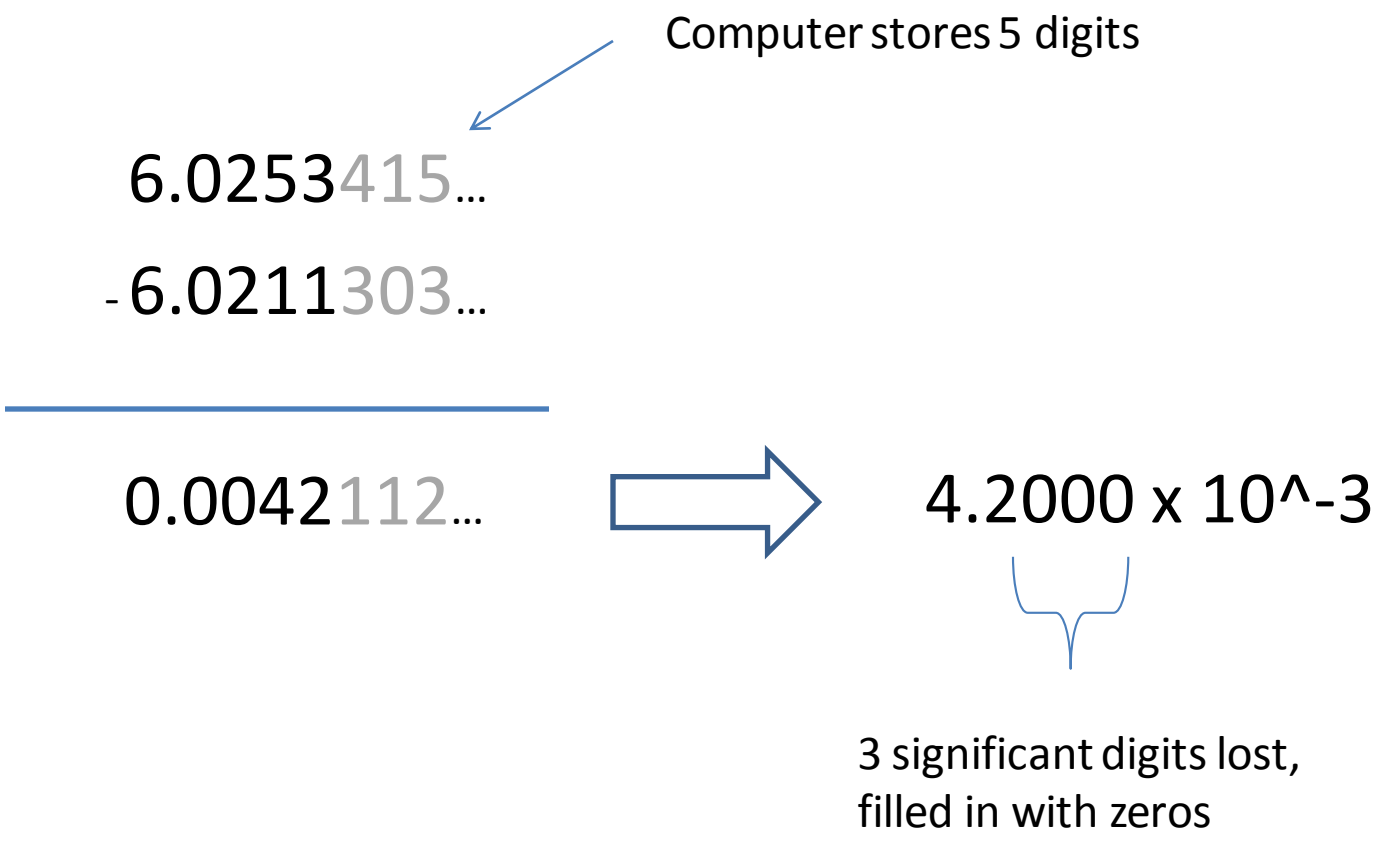
Exponents

- 11 bits can represent 0 … 2^{11} - 1= 2047.
- Store exponent `e` in 2^e as `e` + 1023.
- Could represent `e`'s from -1023 to 1024.
- Actually represent `e`'s from -1022 to 1023.
- Other bit patterns reserved for
  ± 0, denormalized numbers, ±`inf`, and `NaN`

Finite significance

- Multiplication OK
- Division OK
- Addition OK
- Subtraction may be a problem

Loss of significance



Subtraction precision rule

If *x* and *y* agree to *n* bits, you can lose up to *n* bits precision when computing *x*-*y*.

Example: Sample variance

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i, \qquad s^2 = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2$$

First pass through data

Second pass through data

Sample variance (cont.)

$$s^2 = \frac{1}{n(n-1)} \left(n \sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i \right)^2 \right)$$

One pass through data, summing x^2 and x inside same loop.

Problem: The two sums can be approximately equal.

Quadratic equation

$$x = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \quad \cdot \quad \frac{-b - \sqrt{b^2 - 4ac}}{-b - \sqrt{b^2 - 4ac}}$$

$$= -\frac{2c}{b + \sqrt{b^2 - 4ac}}$$

Finite range

- Results too big to store
  overflow to `inf`
- Results too small to distinguish from 0
  underflow to 0
- Range is astronomical, 10^{308}
- But not always big enough
  for **intermediate** results

Probability example

$$\binom{400}{180} 2^{-400} = \frac{400!}{180!\ 220!}\ \frac{1}{2^{400}} = 0.0054$$

```
logp = logfact(400) - logfact(180) - logfact(220)
logp -= 400 log(2)
p = exp(logp)
```

Conclusion

- Avoid subtracting nearly equal numbers.
  Use pencil-and-paper trickery.
- Avoid overflow and underflow.
  Use logarithms.

More information

- What every computer scientist should know about floating-point arithmetic
  http://bit.ly/vBhP9m
- Anatomy of a floating point number
  http://bit.ly/ah51X
- Five tips for floating point programming
  http://bit.ly/NaxZPj
- Avoiding overflow, underflow, and loss of precision
  http://bit.ly/T8tSFS

More information (cont.)

- Numerical exceptions (infinities and NaNs)
  http://bit.ly/kTvYop
- Why computers have two zeros: +0 and -0
  http://bit.ly/bOnxdj
- http://www.johndcook.com/