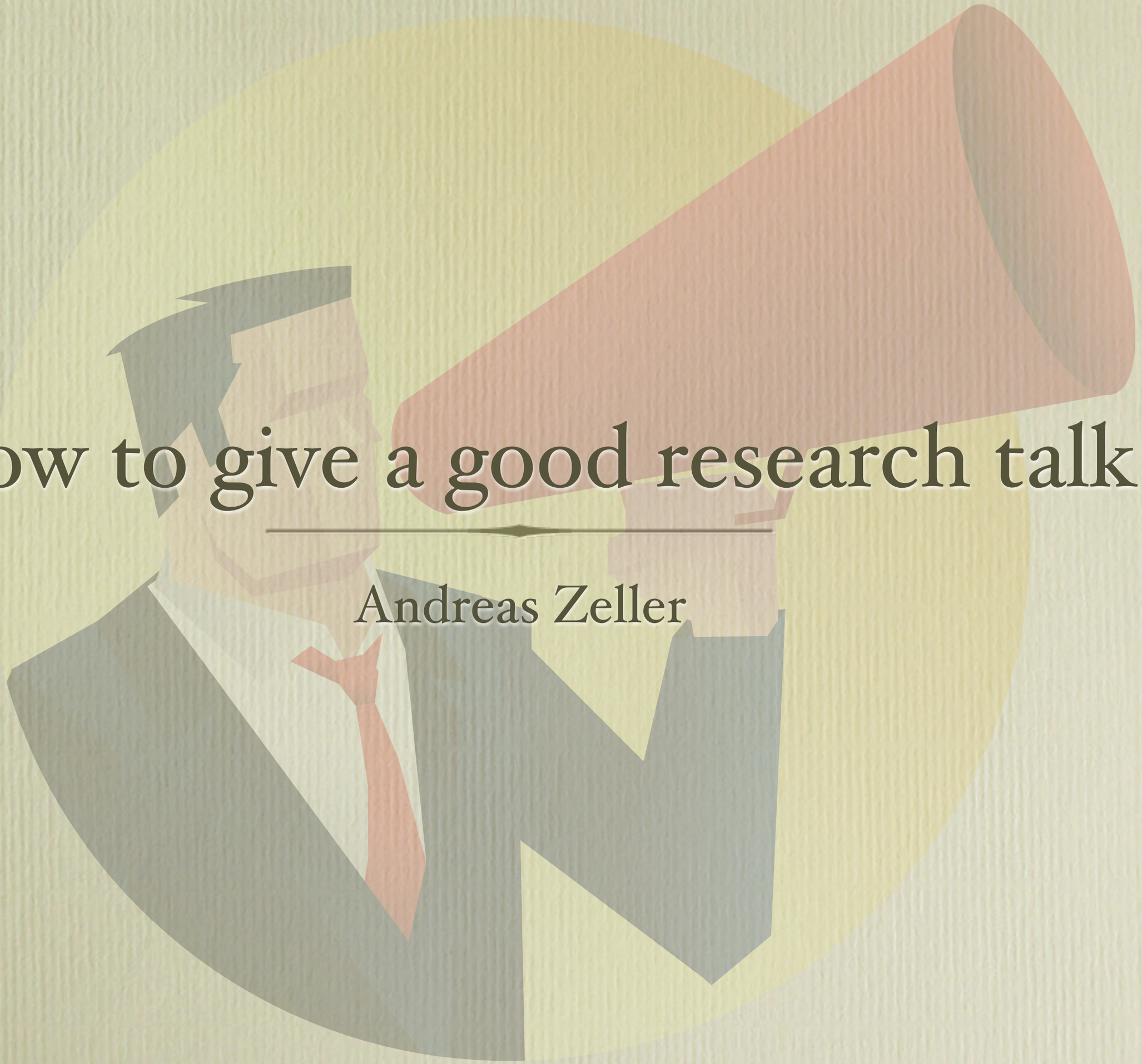


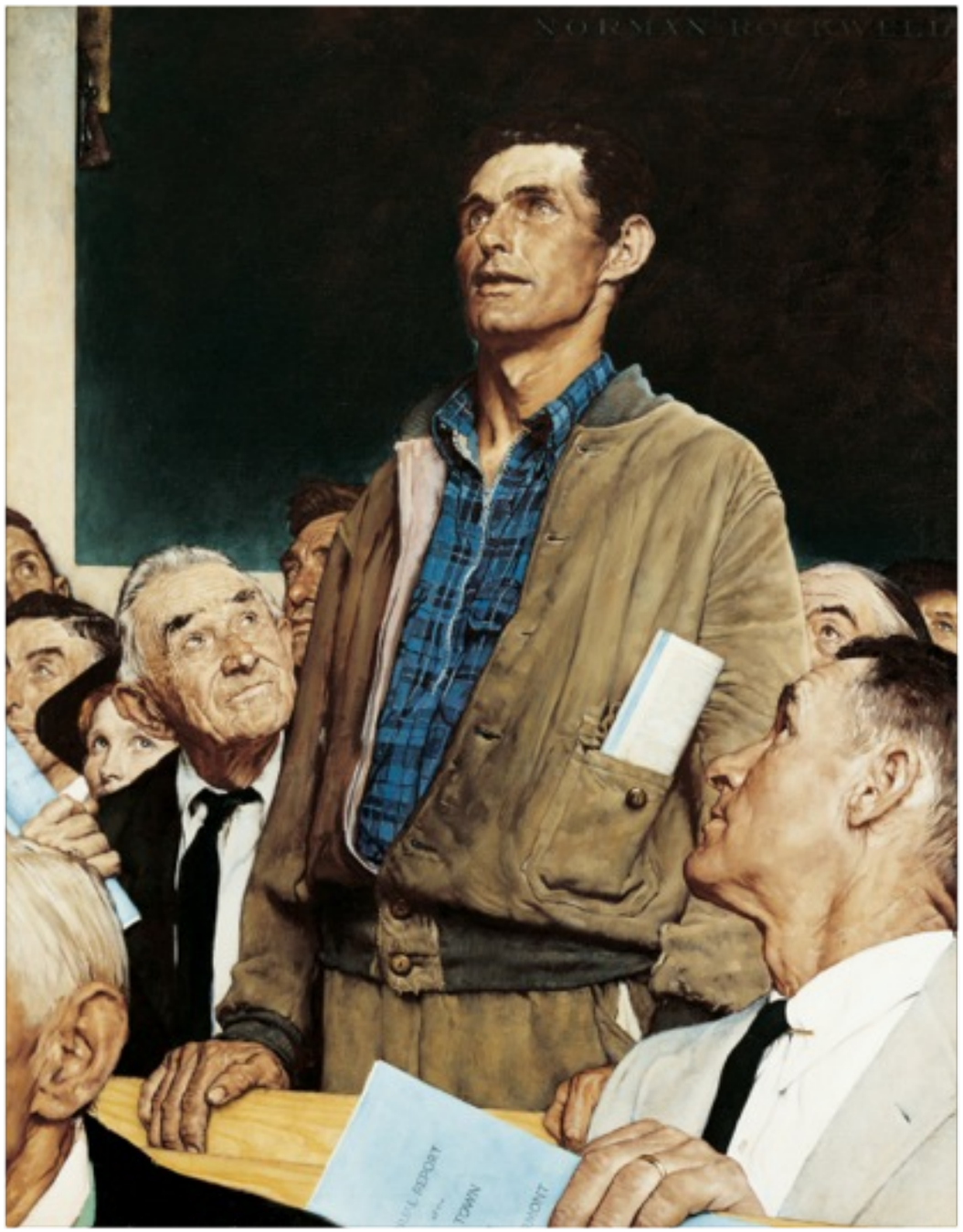
How to give a good research talk

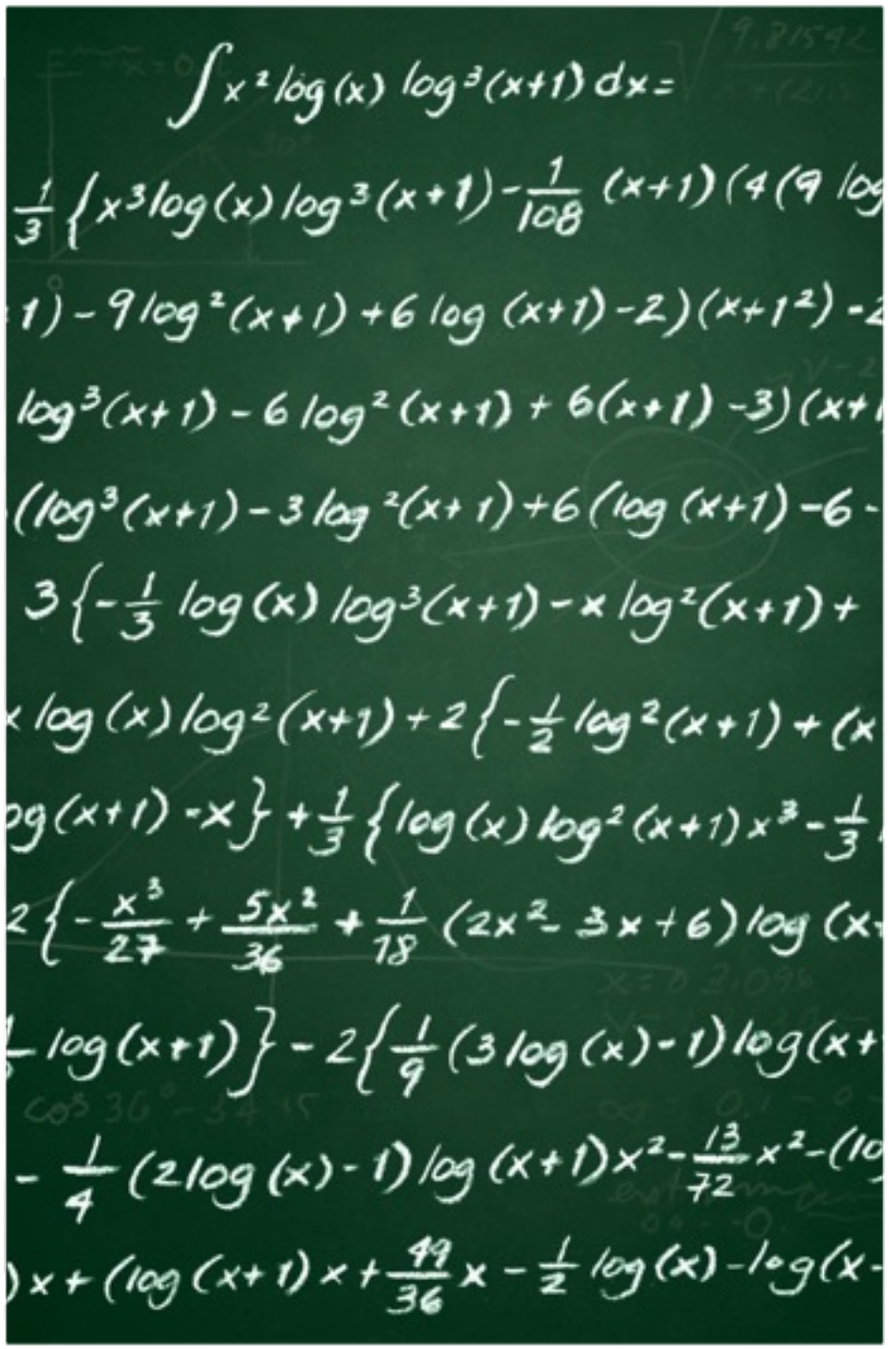
Andreas Zeller

Goals of the Seminar

- Find your way into *scientific challenges*
- *Structure and present* scientific material
- Train your social and communication skills

The Purpose of your Talk





The Purpose of your Talk

The Purpose of your Talk

- Make the audience read your paper
  (and talk about it)
- Give them an *intuitive feel for your idea*
- Engage, excite, provoke them
- Make them glad they came

Preparation

- Check the material
- Identify central topics and claims
- Outline the talk
- Make a detailed sketch

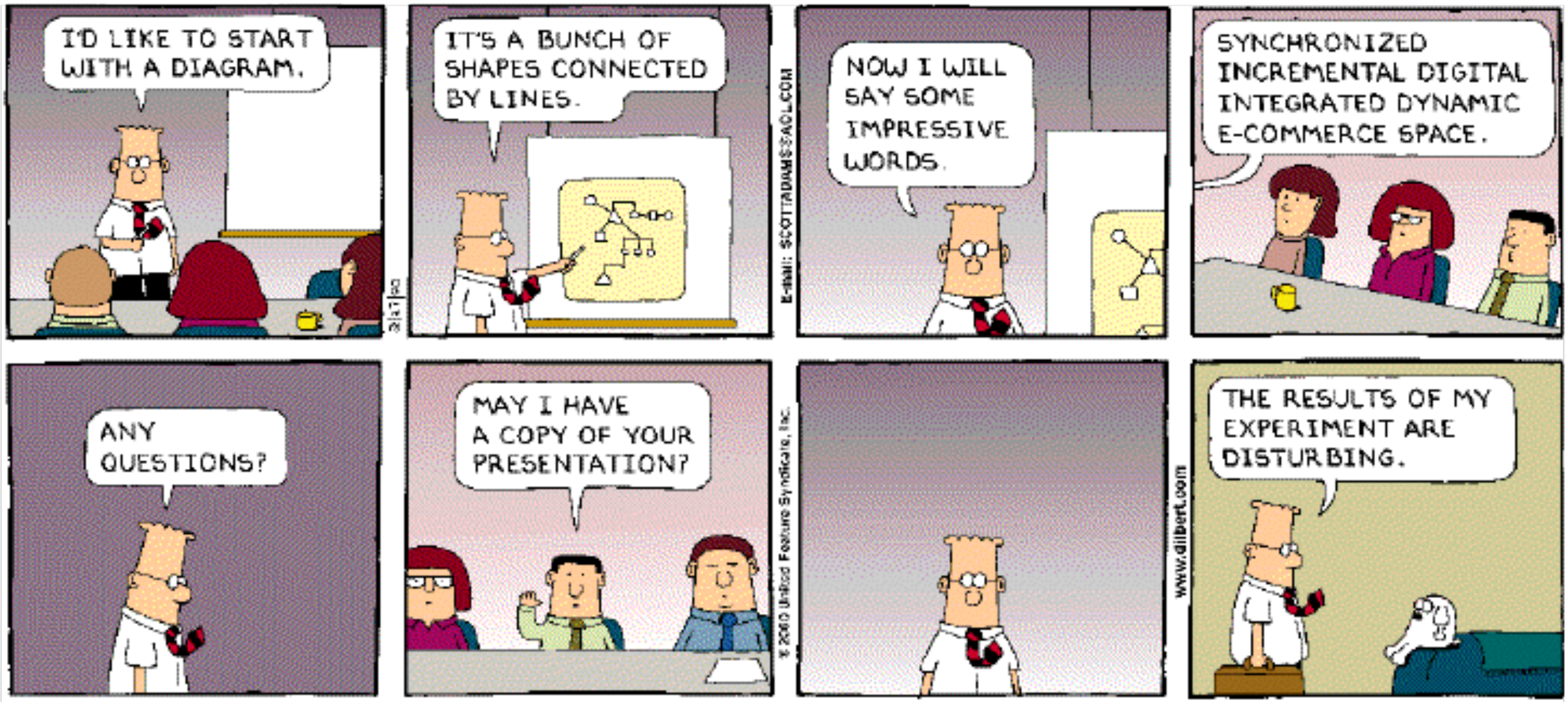
Ask Yourself

- Do the claims hold?
- Are the examples illustrative?
- Can I do better in presenting?
- What are the central claims, anyway?
- And how are they supported?

Ask Yourself

- If someone remembers *one thing* from my research talk, what should it be?

The Perfect Talk



Your Audience

- ~~Have read all your earlier papers~~ have never heard of you
- ~~Thoroughly understand Computational Complexity of Bio-inspired Computation in Combinatorial Optimization~~ have heard of it, but wish they had not
- ~~Are eagerly awaiting your latest and greatest~~ could not care less
- ~~Are fresh, alert, and ready for action~~ just came back from lunch and are ready for a nap

Organizing Your Talk

- Motivation
- Solution (including failures)
- Results
- Conclusion

Motivation

- Present the general topic
  A village in the woods

- Show a *concrete problem*
  (and make it the *audience's problem*)
  Wicked dragon attacks the peasants

- Show that the state of the art is not enough
  Peasants' forks can not pierce dragon armor

Solution + Results

- Show new approach and its advantages
  Hero comes with vorpal blade and fights dragon

- Show how approach solves concrete problem
  Vorpal blade goes snicker-snick; dragon is slayed

- Does the approach generalize?
  Would this work for other dragons, too? Why?

Examples: Your main Weapon

- Motivate work
- Convey basic intuition
- Illustrate idea in action
- Use *examples* first, *generalize* afterwards

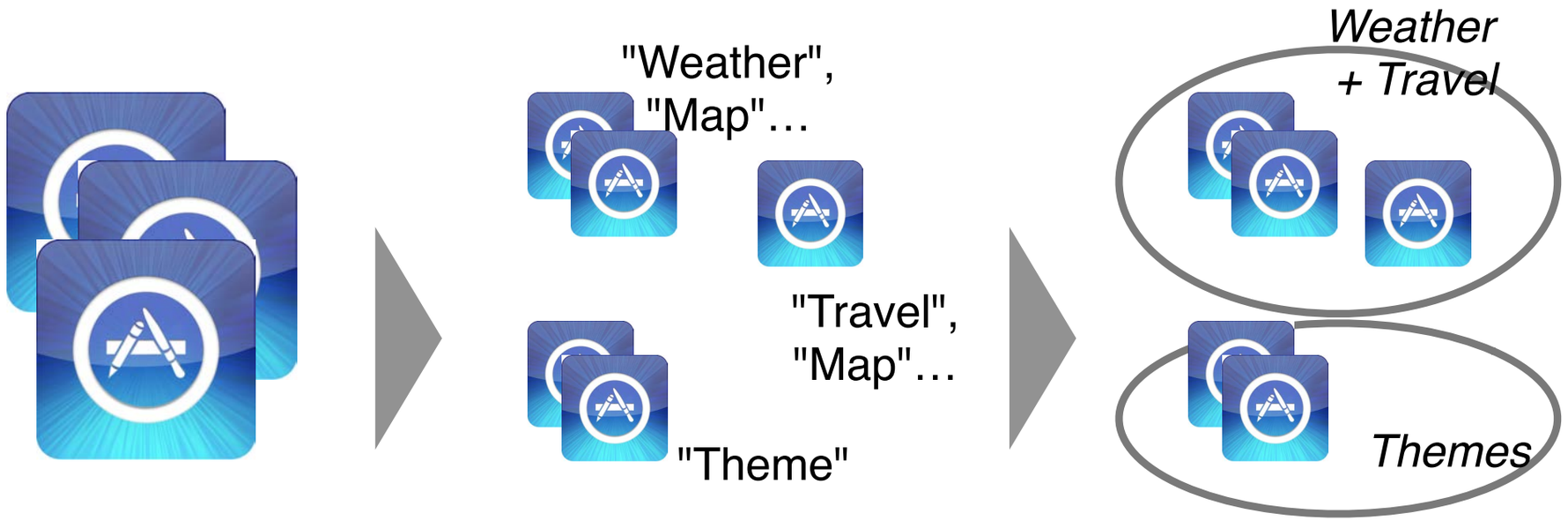
Outline

- Tell a story
- Make slides invisible
- Use examples, lots of examples
- Connect to the audience
- Hope for questions and feedback

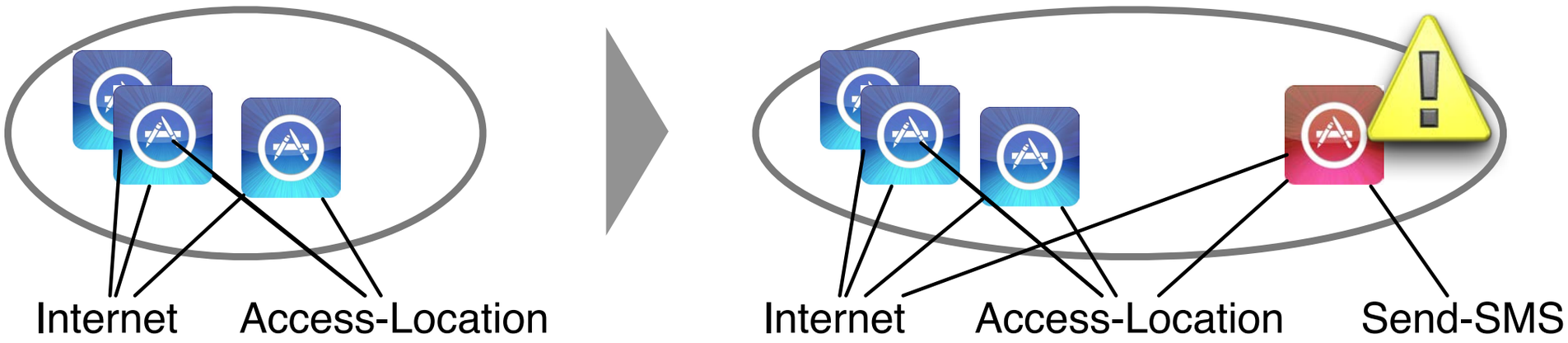
Outlines

- Don't use talk outlines *at the beginning*
- Don't use talk outlines *in between*
- Actually, don't use talk outlines *at all*
- Better: Use a diagram after 5 minutes
- Think of this diagram as a *memorizable image*

CHABADA



1. App collection **2. Topics** **3. Clusters**



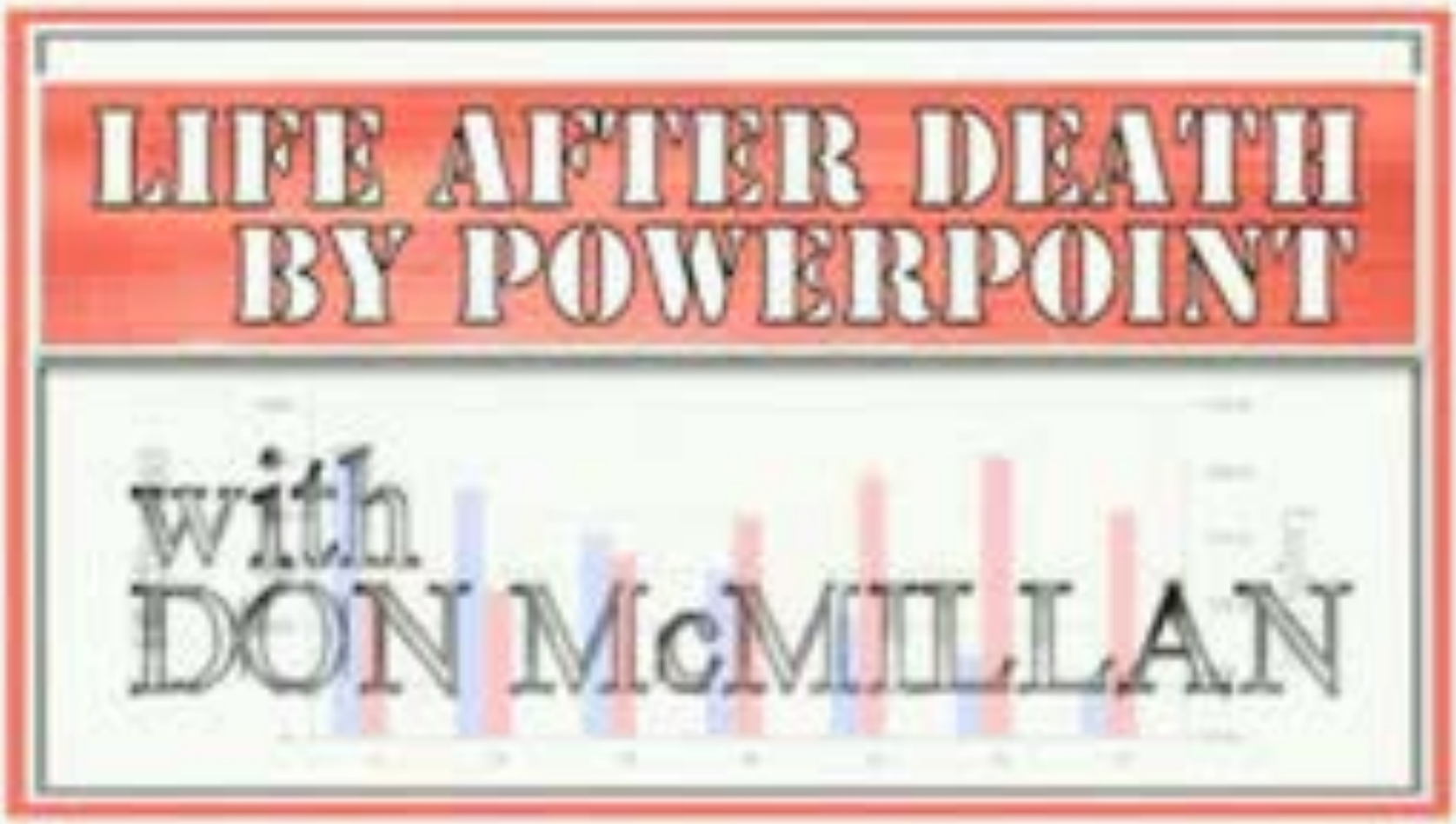
4. APIs **5. Outliers**

Slide Contents

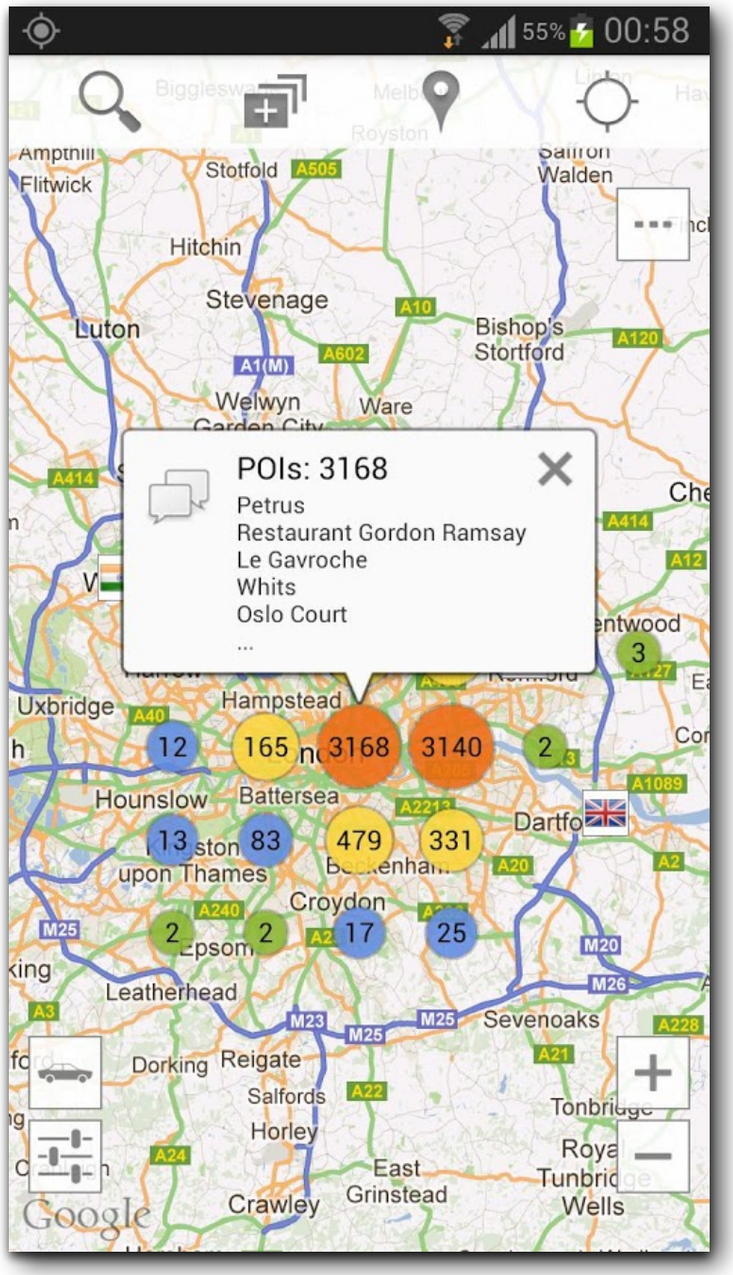
- Concentrate on the bare necessities
  (e.g. at most 5 bullets per slide)

- Do not present full sentences on a slide,
  because these are far too long and hard to read;
  also, they may tempt you in reading them loud.

Death by Powerpoint



Stemming



looking for a restaurant, a bar, a pub or just to have fun in london? search no more! this application has all the information you need:

- you can search for every type of food you want: french, british, chinese, indian etc.
- you can use it if you are in a car, on a bicycle or walking
- you can view all objectives on the map
- you can search objectives
- you can view objectives near you
- you can view directions (visual route, distance and duration)
- you can use it with street view
- you can use it with navigation

keywords: london, restaurants, bars, pubs, food, breakfast, lunch, dinner, meal, eat, supper, street view, navigation

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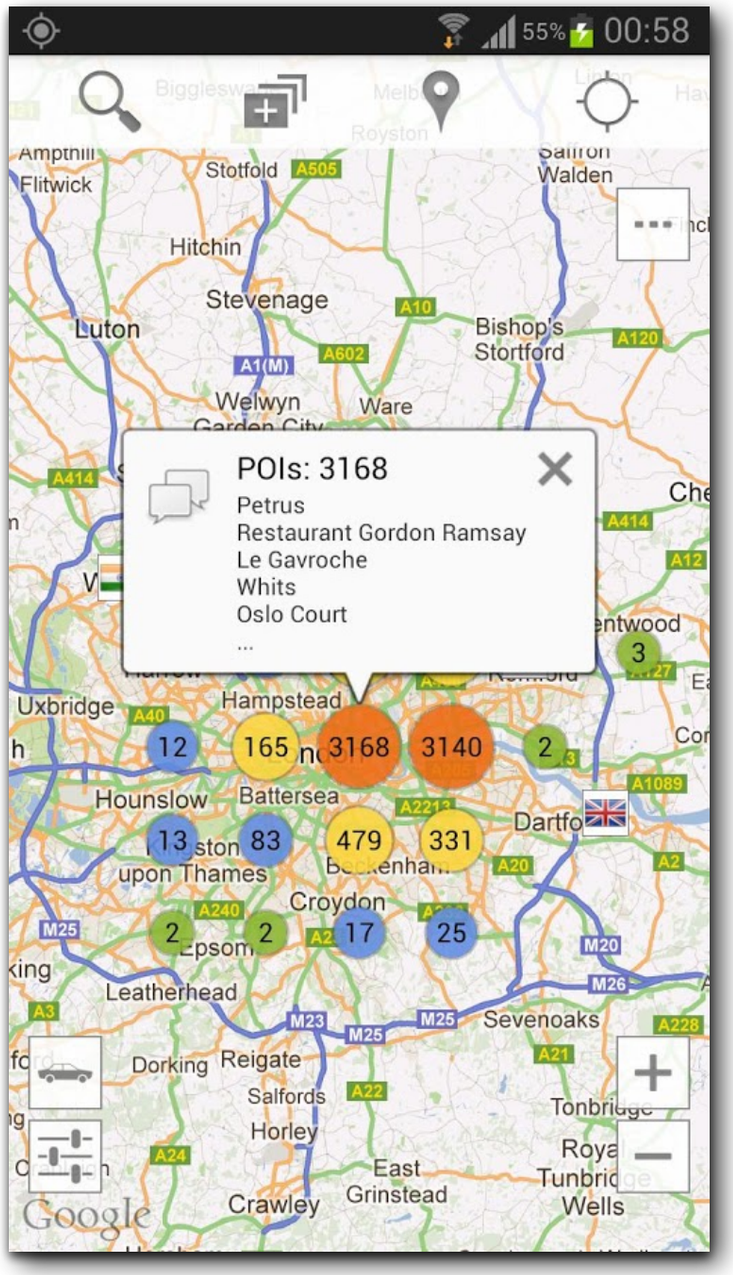

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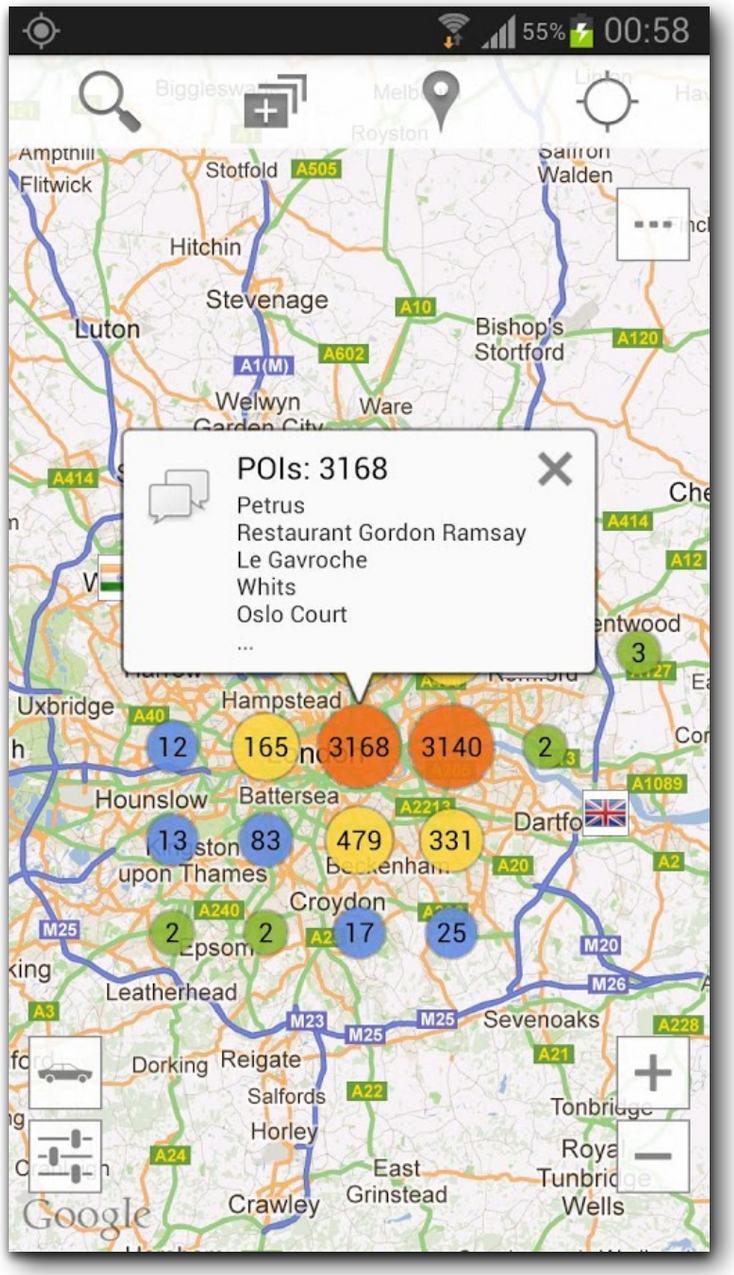

look london restaur search bar pub just applic fun

inform can search need everi type food want french

british chines indian etc car bicycl walk

can us can view object map visual rout

can search object search can view distanc

durat can view direct object near

can us street view can us navig

keyword london restaur bar pub food view

breakfast lunch dinner meal eat supper street navig

Make Slides Invisible

- Focus on *clarity*
- Avoid all that distracts from the message
- Slides should *support* your (spoken) word
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- Avoid bullet lists (like this one)

“Travel” Cluster

Maths

$$
\begin{aligned}
f_{h,\varepsilon}(x,y) &= \varepsilon \mathbf{E}_{x,y} \int_0^{t_\varepsilon} L_{x,y_\varepsilon(\varepsilon u)} \varphi(x)\, du \\
&= h \int L_{x,z} \varphi(x) \rho_x(dz) \\
&\quad + h \left[\frac{1}{t_\varepsilon} \left(\mathbf{E}_y \int_0^{t_\varepsilon} L_{x,y^x(s)} \varphi(x)\, ds - t_\varepsilon \int L_{x,z} \varphi(x) \rho_x(dz) \right) \right. \\
&\qquad \left. + \frac{1}{t_\varepsilon} \left(\mathbf{E}_y \int_0^{t_\varepsilon} L_{x,y^x(s)} \varphi(x)\, ds - \mathbf{E}_{x,y} \int_0^{t_\varepsilon} L_{x,y_\varepsilon(\varepsilon s)} \varphi(x)\, ds \right) \right] \\
&= h \widehat{L}_x \varphi(x) + h \theta_\varepsilon(x,y)
\end{aligned}
$$

Formal Background

Concrete state $v \in V$ with $v = (x_1, x_2, \ldots, x_n)$

x_i – Return value of an inspector

Trace $t = [(v_1, m_1, v_1'), (v_2, m_2, v_2'), \ldots]$

with $v_i \in V$ and m_i – name of a mutator

State abstraction $abs: V \to S$

Model with transitions $s \xrightarrow{m} s'$ and states $s, s' \in S$

Transition condition $s \xrightarrow{m} s'$ with $s, s' \in S$ iff

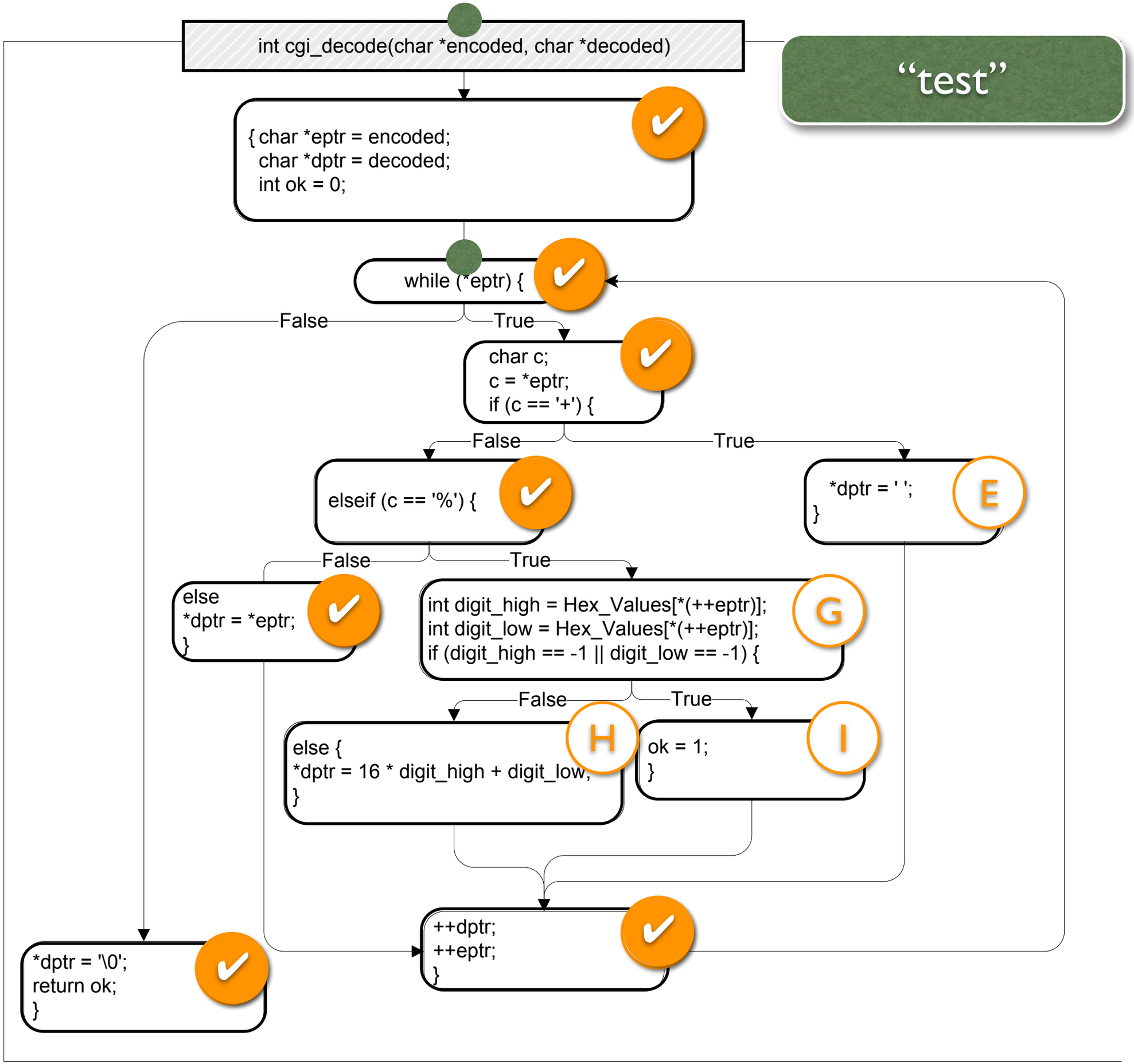
$\exists (v, m, v') \in t \cdot abs(v) = s \wedge abs(v') = s'$

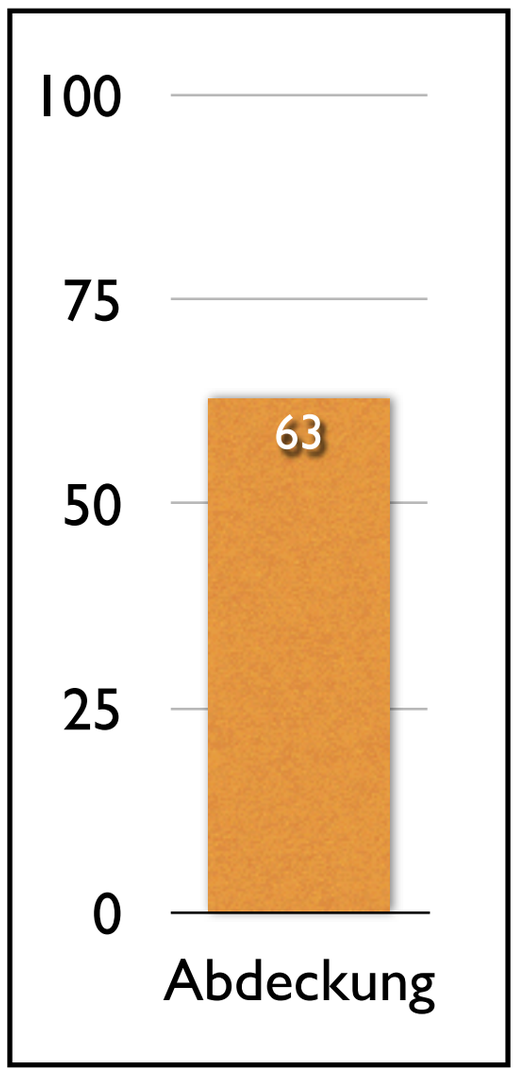
Maths

- Avoid maths.
  - Formulae are for papers, not slides
  - Few people can read + understand complex formulae in 30 seconds
- Demonstrate that the formal foundation can be presented on demand

Examples

- Examples are more important than maths
- Have one example throughout your talk to illustrate the key idea
- Use additional examples for specifics
- Your audience will get excited by the example – and read your paper for the full foundations


int cgi_decode(char *encoded, char *decoded)
"test"
{ char *eptr = encoded;
char *dptr = decoded;
int ok = 0;
while (*eptr) {
False
True
char c;
c = *eptr;
if (c == '+') {
False
True
elseif (c == '%') {
*dptr = ' ';
}
E
False
True
else
*dptr = *eptr;
}
int digit_high = Hex_Values[*(++eptr)];
int digit_low = Hex_Values[*(++eptr)];
if (digit_high == -1 || digit_low == -1) {
G
False
True
else {
*dptr = 16 * digit_high + digit_low;
}
H
ok = 1;
}
I
++dptr;
++eptr;
}
*dptr = '\0';
return ok;
}



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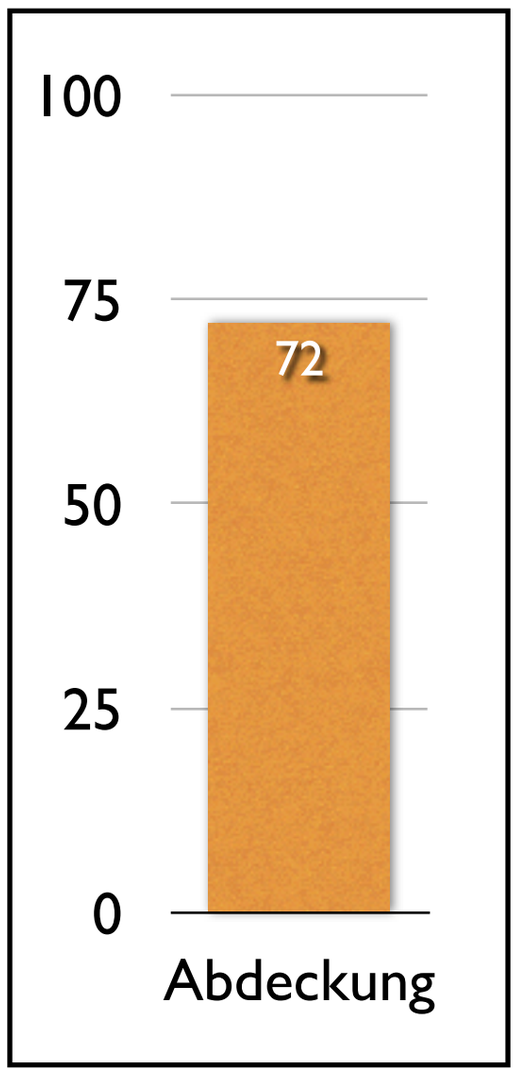

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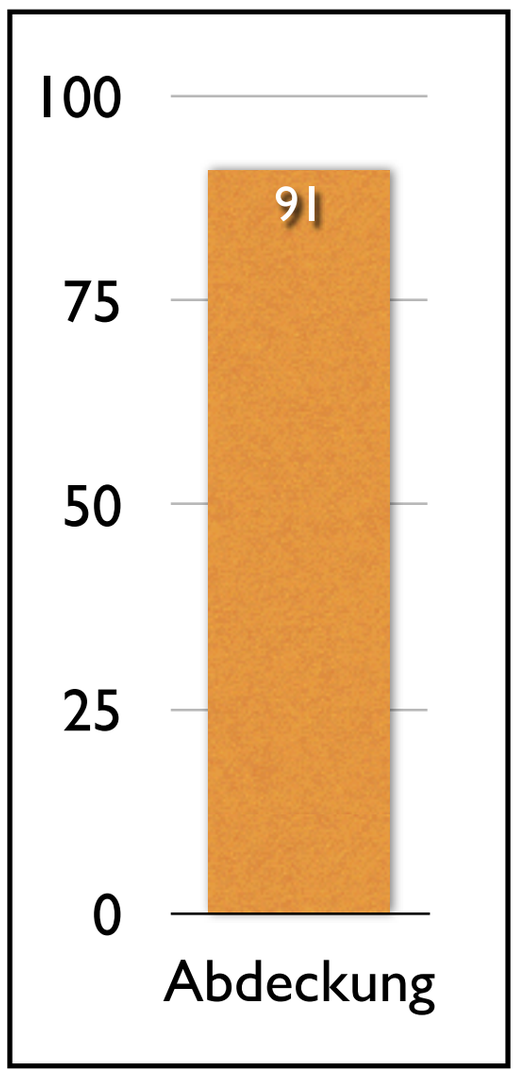
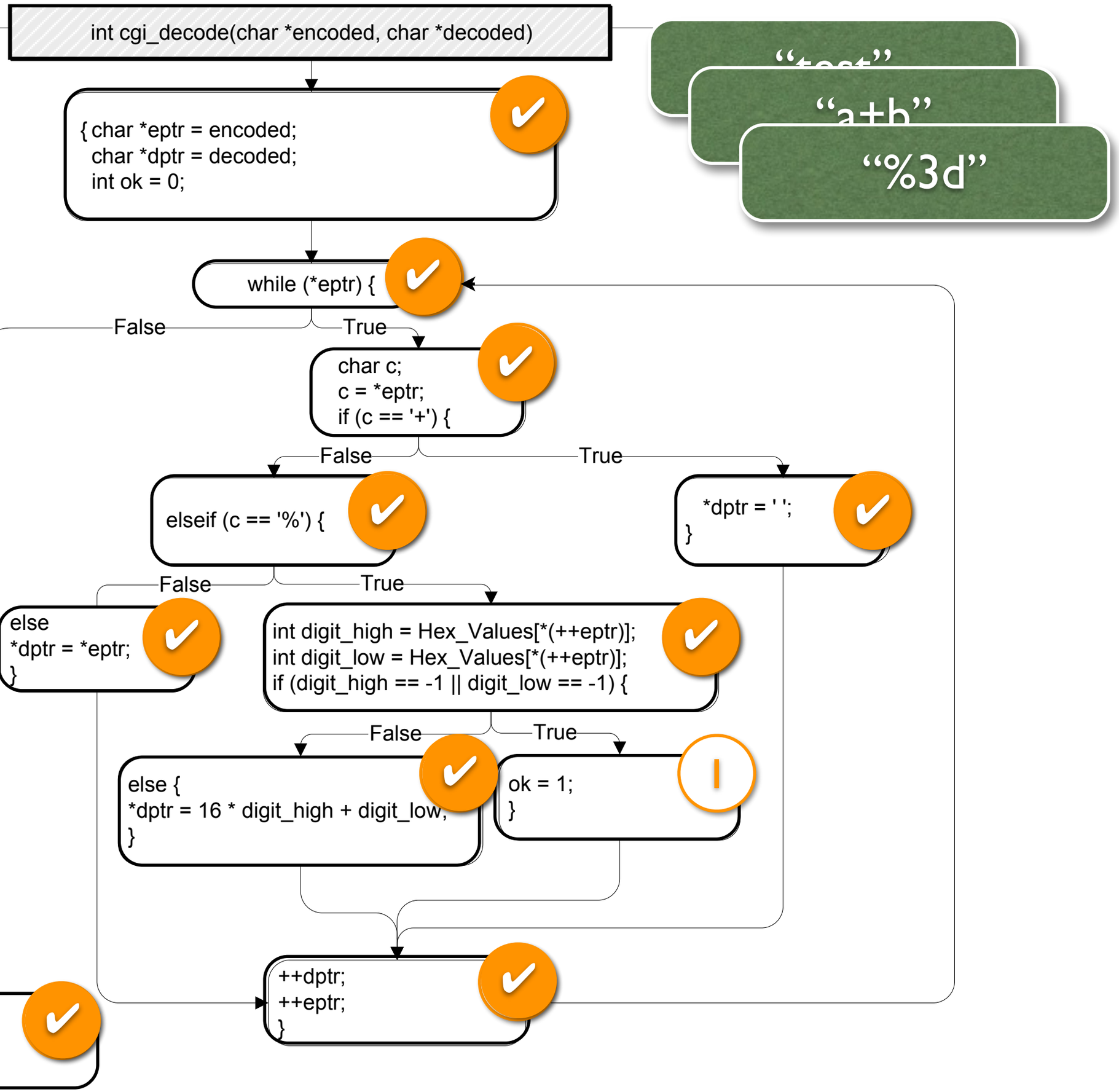
“test”

“a+b”


100
75
50
25
0
91
Abdeckung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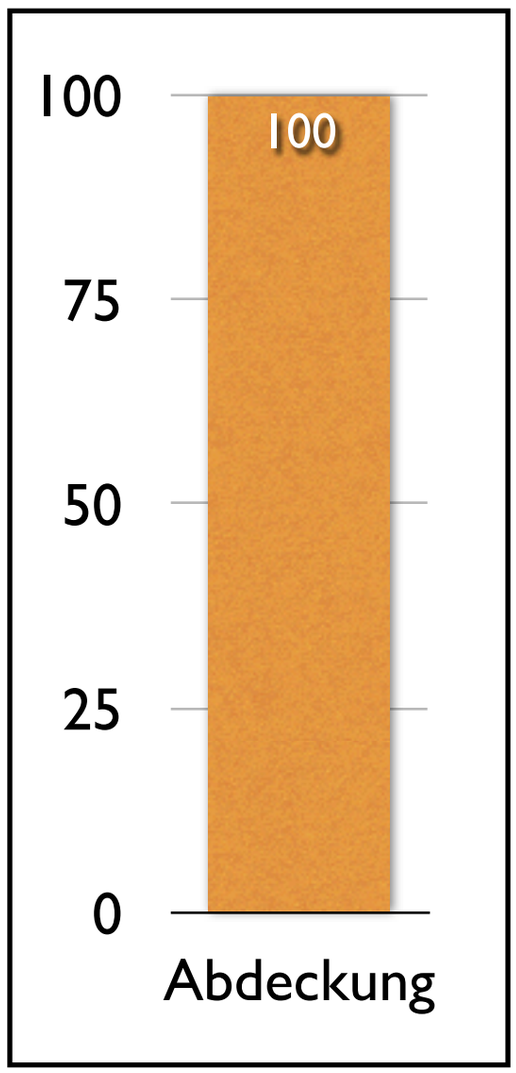
“a+b”
“%3d”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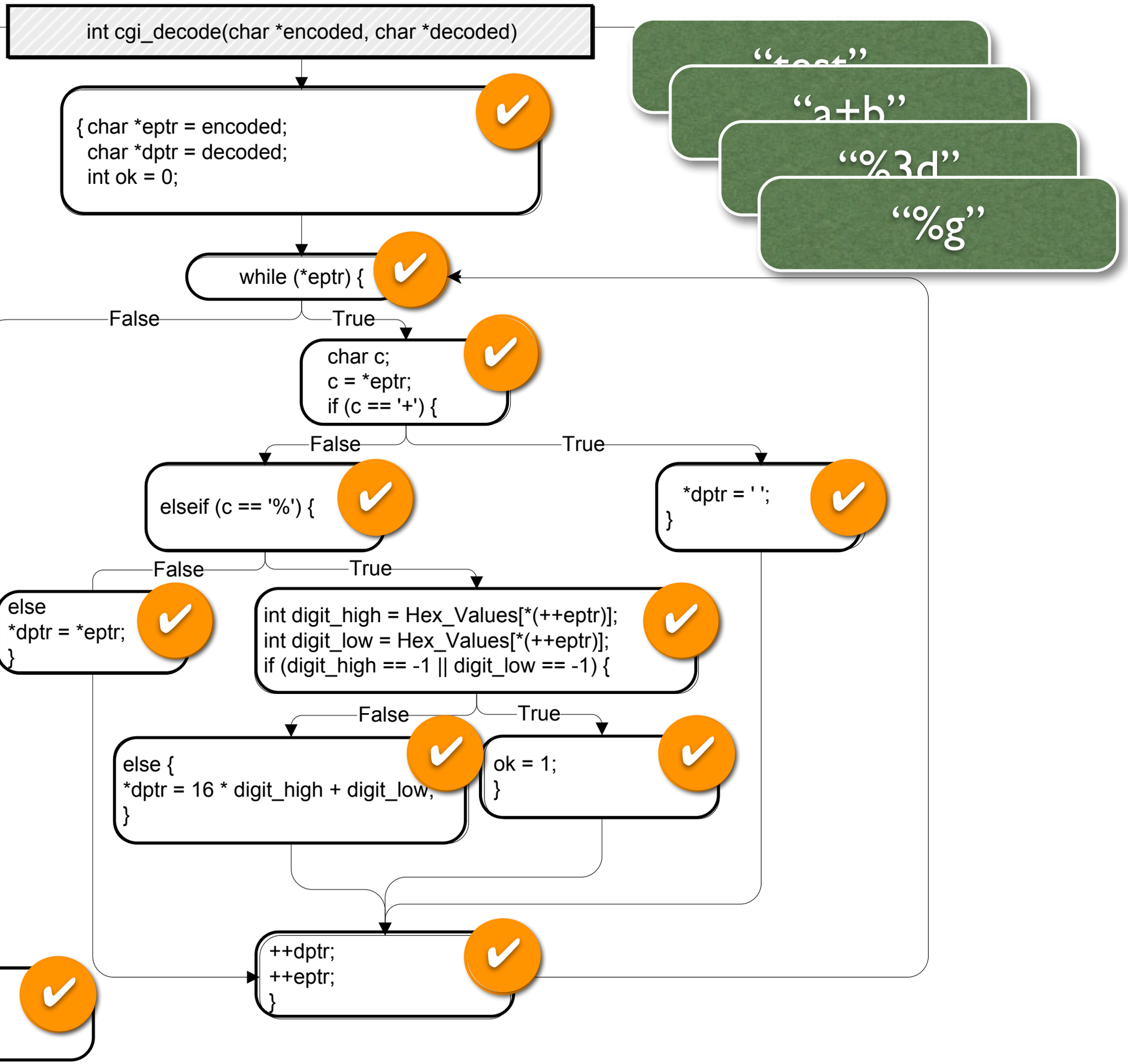
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“a+b”
“%3d”
“%g”

Diagrams

- Use simple, clear diagrams
- Convey exactly *one* message per diagram

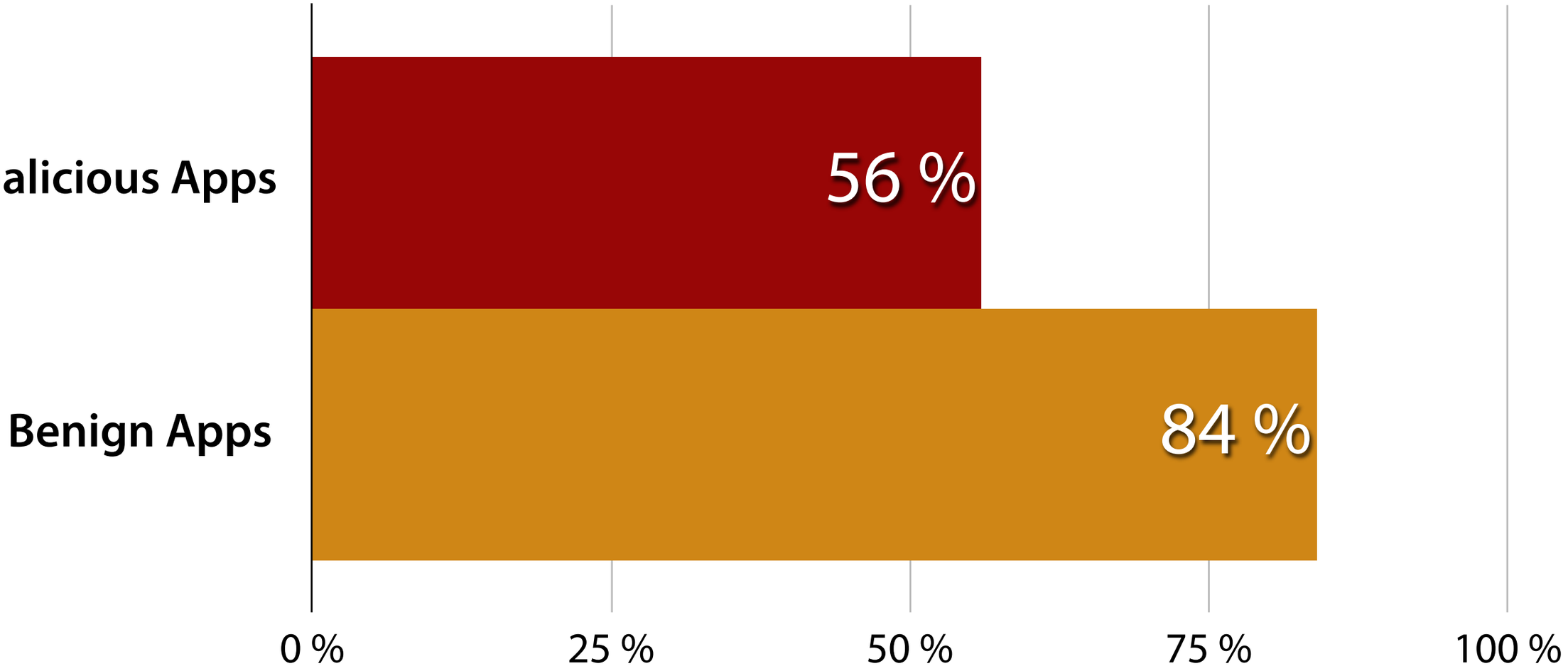
App Classification

With Clusters (our approach)

	Predicted as Malicious	Predicted as Benign
Malicious Apps	56 %	44 %
Benign Apps	16 %	84 %

Correct Classification

With Clusters (our approach)



Visuals and Animation

- Visuals and animations are ok in *diagrams*
- Every other use should be well motivated
- Do not use them as decorations
- Do not use them as distractions
- Avoid overused graphic clichés

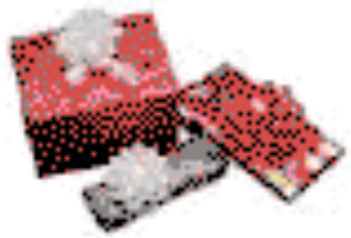
What's Wrong?

What people are saying about our new techniques

Powerful

Successful

Rewarding



Death by Powerpoint

Strive for Simplicity

- Simple *messages* get across easier
- Simple *examples* fit on one slide
- Simple *slides* make the audience listen
- Simple *claims* tend to be general, too
- Simple = Hard!

The Talk

- Do not *read your slides* (from paper or slides)
- Speak slowly, loudly and clearly
- Speak *personally* (Use “I”, not “one”)
- Change your *tone* – and use *pauses*

The Jelly Factor

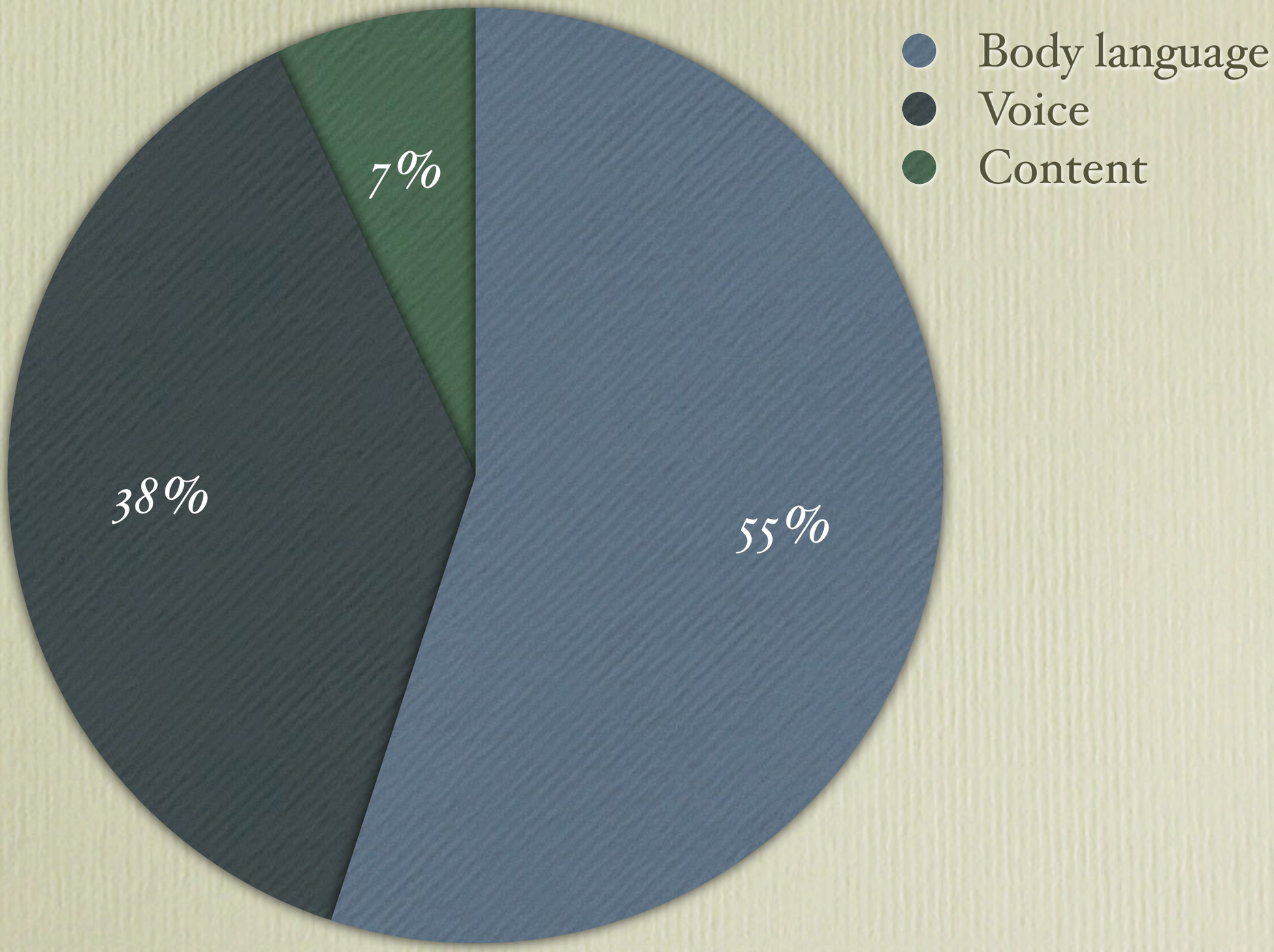
- Every presenter is nervous (and so am I)
  - Legs start shaking
  - Need for air
  - Brain goes into stand-by mode
- ... but nobody will notice, let alone worry

The Jelly Factor

Before the talk:

- Wash your hands
- Sit down
- Go through your slides
- Memorize the first sentences
  (no brain required)

Your Impression

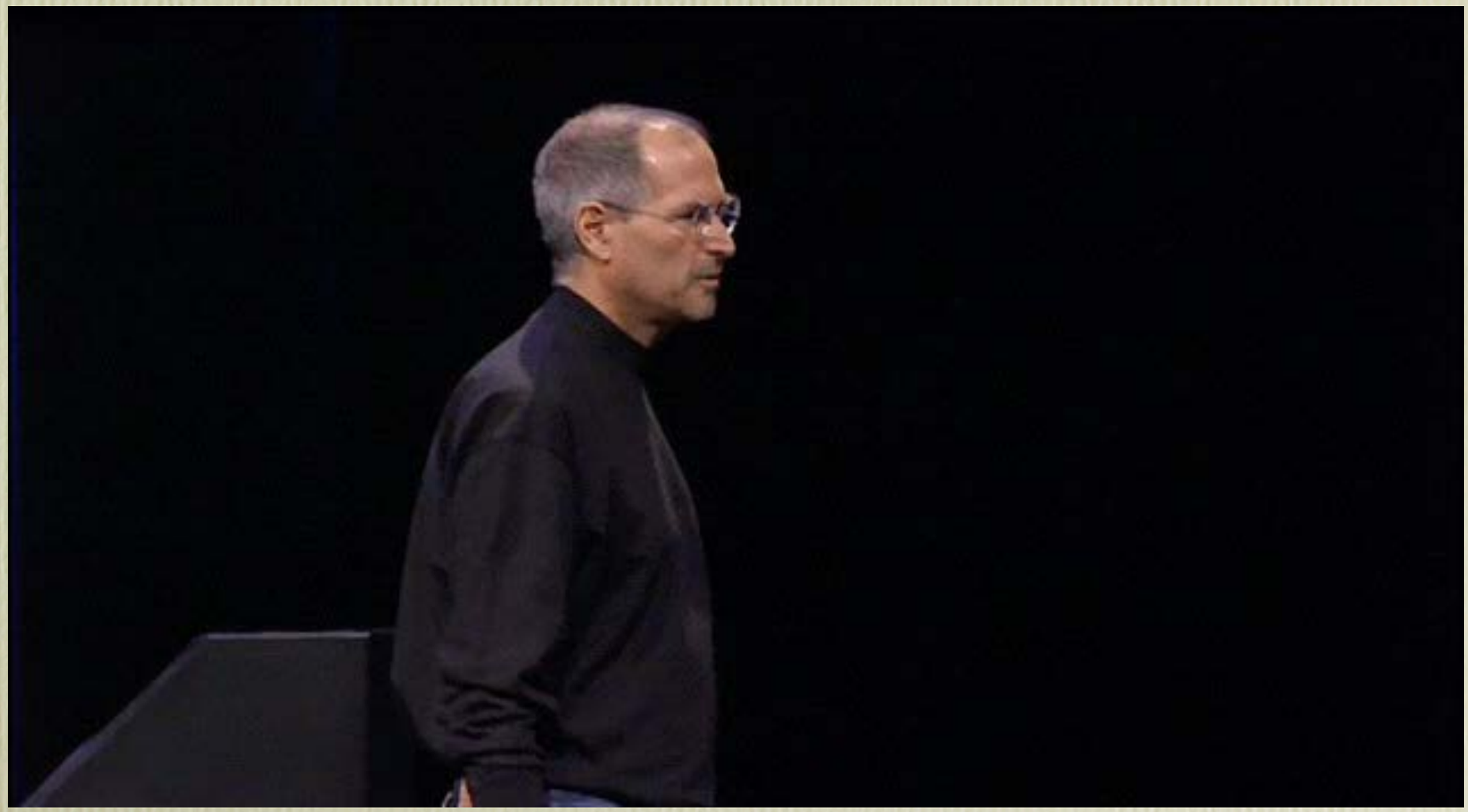


Connect to the Audience

- Tell a *story*
- Talk *directly* to the audience
- Ask *rhetorical questions*
  ("What should the poor peasants do?")
- Search *eye contact* to audience
  (not to slides, not to professor)
- Convey your own *enthusiasm and excitement!*

Some Great Presenters

Steve Jobs



Lawrence Lessig

Concluding the Talk

- Refer to the beginning
  ...and they lived in peace henceforth

- Summarize
  ...and the key point is:

- Open issues
  ...but there are more dragons that loom in the dark

- Consequences
  If you ever see a dragon, ...

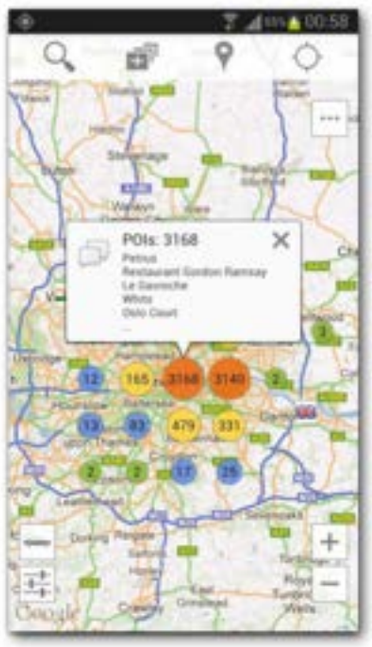
CHABADA

Travel Cluster

Description

APIs used

London Restaurants



android.net.ConnectivityManager.getActiveNetworkInfo()
android.webkit.WebView()
java.net.HttpURLConnection.connect()
android.app.NotificationManager.notify()
java.net.URL.openConnection()
android.telephony.TelephonyManager.getDeviceId()
org.apache.http.impl.client.DefaultHttpClient()
org.apache.http.impl.client.DefaultHttpClient.execute()
android.location.LocationManager.getBestProvider()
android.telephony.TelephonyManager.getLine1Number()
android.net.wifi.WifiManager.isWifiEnabled()
android.accounts.AccountManager.getAccountsByType()
android.net.wifi.WifiManager.getConnectionInfo()
android.location.LocationManager.getLastKnownLocation()
android.location.LocationManager.isProviderEnabled()
android.location.LocationManager.requestLocationUpdates()
android.net.NetworkInfo.isConnectedOrConnecting()
android.net.ConnectivityManager.getAllNetworkInfo()

→ **An *Outlier* in the "Travel" Cluster**

Key Findings

- Of the top 5 outliers per cluster, 26% show unadvertised (covert) behavior
  - Typically *ad frameworks* (apploving, airpush)
  - Several anomalies (UNO, WICKED, Yahoo! Mail…)
- Using OC-SVM as a classifier of APIs per cluster, we could flag 56% of novel malware as such
- Current work: Dynamic API usage, information flow, user authorization

http://www.st.cs.uni-saarland.de/chabada/

Any Questions?

- Good research raises lots of questions!
- Questions are great to connect to the audience and to direct and shape own work
- The worst embarrassment is to *have no questions at all*

Dealing with Hard Questions

- Repeat question (helpful for audience + gives time for preparing an answer)
- In doubt: “I don’t know, but I’ll look into it”
- Or: “Let’s just take this offline”
- Be respectful to the audience –
  no punching in the lecture room

The Purpose of your Talk

- Make the audience read your paper *(and talk about it)*
- Give them an *intuitive feel for your idea*
- Engage, excite, provoke them
- Make them glad they came

Make Slides Invisible

- Focus on *clarity*
- Avoid all that distracts from the message
- Slides should *support* your (spoken) word
- Always prefer diagrams over text
- Avoid bullet lists (like this one)

Summary

Examples

- Examples are more important than maths
- Have one example throughout your talk to illustrate the key idea
- Use additional examples for specifics
- Your audience will get excited by the example – and read your paper for the full foundations

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LIFE

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