Preface & Intro

- A requirement of Independent Work at Princeton is that students must give a final presentation talk.

- We believe that human presentation skills are core skills in the age of AI!
  - It must be in-person for a thesis
  - It may be via a recorded video for one-term work
  - If it is a recorded video, then the format may include:
    - A slide presentation
    - A poster presentation
    - A demonstration

Deadlines for these are given on the COS IW website!

Learning to Give an Excellent IW Talk

Robert S. Fish
Princeton University

Why This Title?

Why This Title?

There have been previous talks on this subject:

- How to give a great research talk, Ju
- How to give a good talk, Fleet and Hertzmann
- How to give a good research talk, Jones et al.
- How to give a good research talk, Zeller
- How to give a good research talk, Scott
- Give a good research talk, Xu
- How to give good presentations, Carlton & Jacob
- How to give a bad talk, Paterson

Why This Title?

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At Princeton, we strive for EXCELLENCE!
(why settle for just “good” or “great”?)

Motivation

Giving excellent technical talks helps you …

- Communicate your ideas to others
- Get useful feedback to guide your next steps
- Encourage people to learn more about your work
- Garner interest in your ideas



Giving excellent talks
is one of the
core skills to learn
as a student

Goal of this Information Session

Teach you how to design excellent technical talks

- Stimulate critical thinking about talk design
- Enhance awareness of common pitfalls
- Provide concrete guidance for your upcoming talk



Main takeaway:
guidelines
for designing
excellent talks

Plan for this Information Session

Part 1: Discuss basic principles of slide design

- Colors, fonts, text, figures, animations, etc.
- Layouts, context, consistency, etc.

Part 2: Provide a roadmap for how to organize a talk

- Suggest a particular flow of ideas
- Explain why that flow of ideas is good
- Discuss alternatives

Part 3: Suggestions for the Presentation

- Understand your audience
- How to speak
- Practice

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Part 1: Slide Design

Basic principles of slide design

- Colors
- Fonts
- Text
- Equations
- Figures
- Animations
- Layout
- Context
- Consistency
- etc.

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Choose colors carefully
(what you see on your laptop is not what your audience sees)

Part 1: Slide Design

Basic principles of slide design

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- etc.



Don’t do this

Part 1: Slide Design

Basic principles of slide design

- Colors
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- etc.

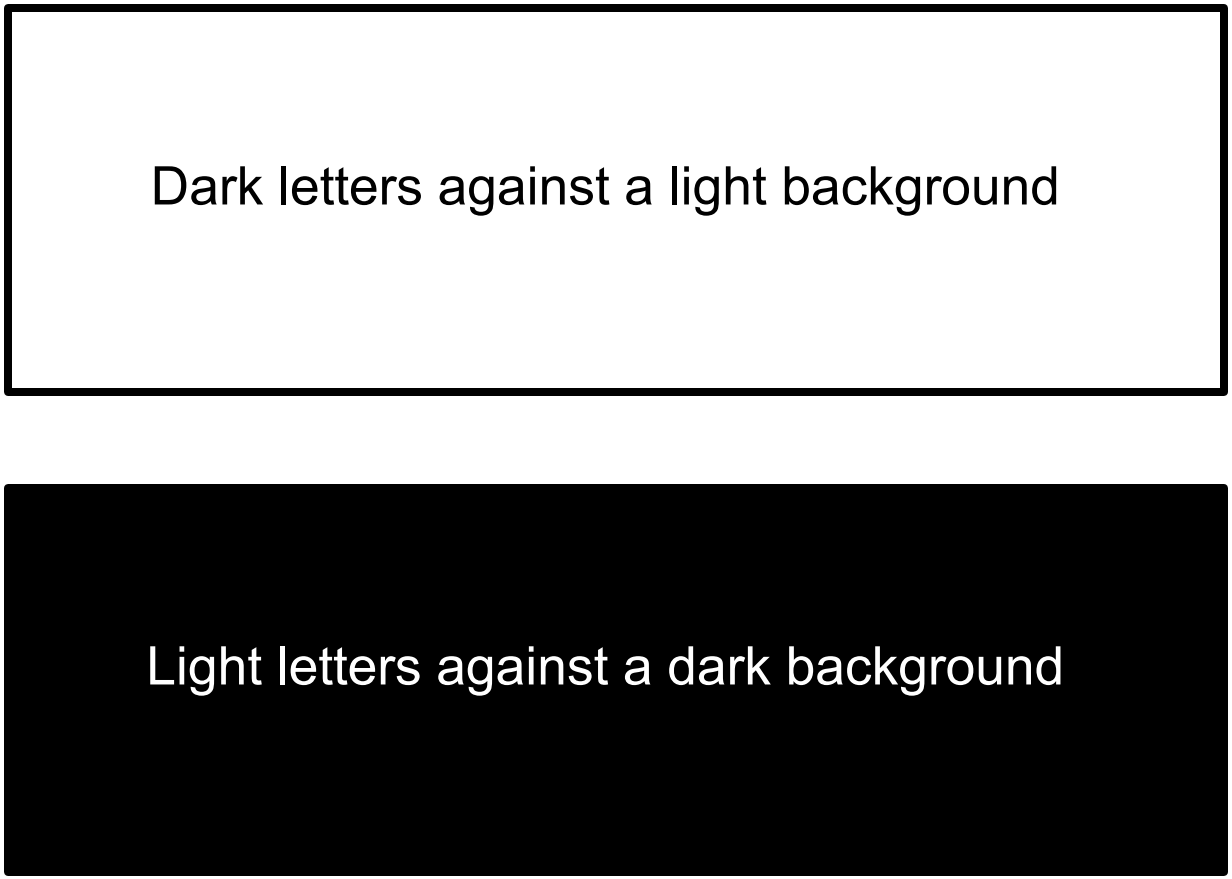


Don’t do this

Part 1: Slide Design

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- etc.



Do this

Part 1: Slide Design

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- Layout
- Context
- Consistency
- etc.

It is a common mistake to highlight a word by using a light color on a light or white background

It is a common mistake to highlight a word by using a dark color on a dark or black background

Don't do this

Part 1: Slide Design

Basic principles of slide design

- Colors
- ➢ Fonts
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- etc.

Part 1: Slide Design

Basic principles of slide design

- Colors
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- Layout
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- etc.

28pt: Arial, Cambria, Times, Courier, M

24pt: Arial, Cambria, Times, Courier, *Monotype*

22pt: Arial, Cambria, Times, Courier, *Monotype*

20pt: Arial, Cambria, Times, Courier, *Monotype*

18pt: Arial, Cambria, Times, Courier, *Monotype*

16pt: Arial, Cambria, Times, Courier, *Monotype*

14pt: Arial, Cambria, Times, Courier, *Monotype*

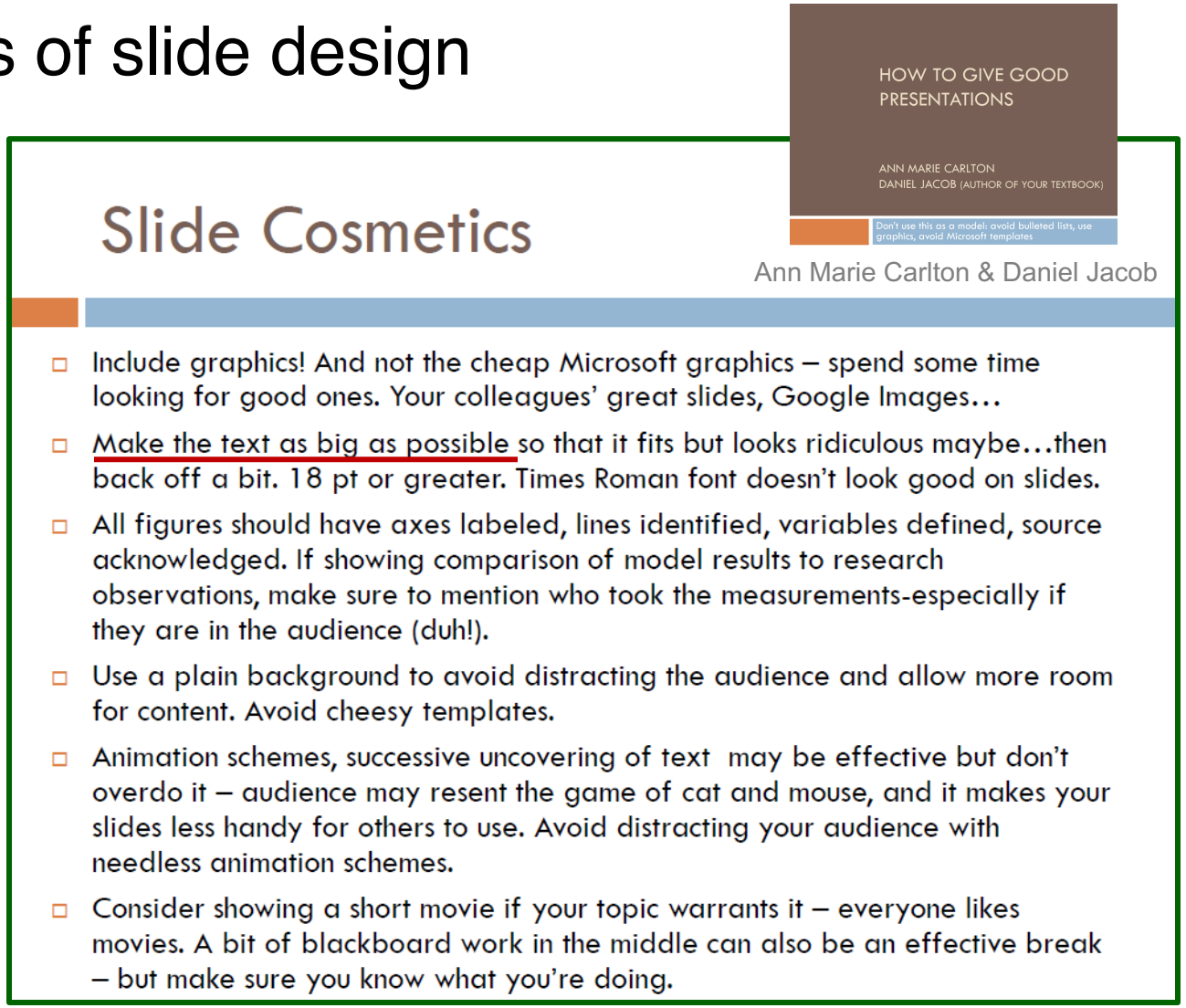
12pt: Arial, Cambria, Times, Courier, *Monotype*

Choose fonts that are easiest to read

Part 1: Slide Design

Basic principles of slide design

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- etc.



Don't do this

Part 1: Slide Design

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- etc.

Bad Decisions Regarding Fonts

Small text (18pt font)

ENTIRE SENTENCES IN ALL CAPS

Entire sentences of bold text

Serif fonts (e.g., Times New Roman)



Don’t do any of this

Part 1: Slide Design

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- etc.

24pt fonts or larger
(depending on size of room)

Sans serif fonts

Arial
Helvetica
Tahoma
Verdana

Do this

Part 1: Slide Design

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Part 1: Slide Design

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- etc.

Popular Sorts

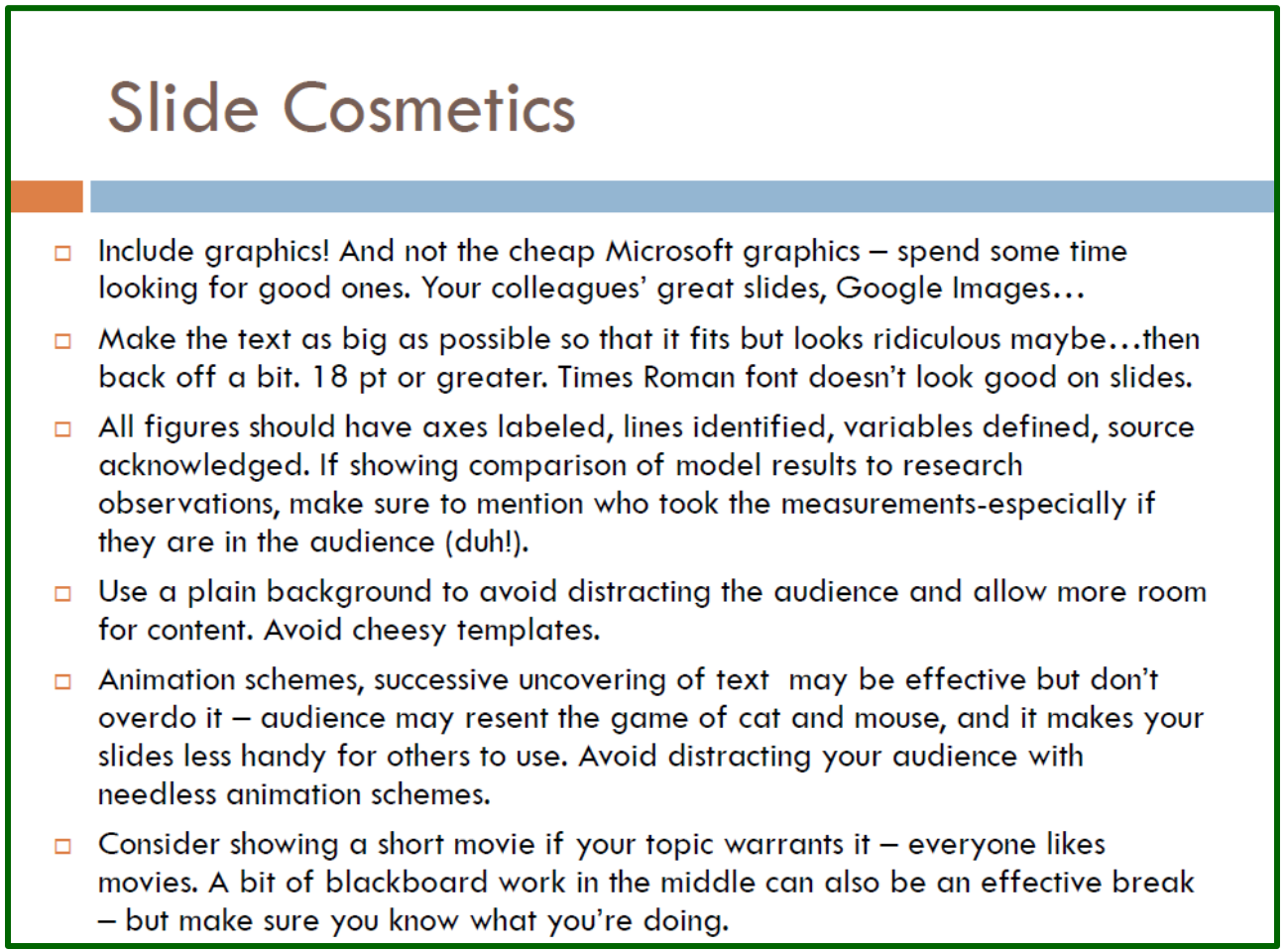
- **Insertion sort** is a simple sorting algorithm that is relatively efficient for small lists and mostly sorted lists, and is often used as part of more sophisticated algorithms. It works by taking elements from the list one by one and inserting them in their correct position into a new sorted list.
- **Heapsort** is a much more efficient version of selection sort. It also works by determining the largest (or smallest) element of the list, placing that at the end (or beginning) of the list, then continuing with the rest of the list, but accomplishes this task efficiently by using a data structure called a heap, a special type of binary tree.[25] Once the data list has been made into a heap, the root node is guaranteed to be the largest (or smallest) element. When it is removed and placed at the end of the list, the heap is rearranged so the largest element remaining moves to the root.
- **Merge sort** takes advantage of the ease of merging already sorted lists into a new sorted list. It starts by comparing every two elements (i.e., 1 with 2, then 3 with 4...) and swapping them if the first should come after the second. It then merges each of the resulting lists of two into lists of four, then merges those lists of four, and so on; until at last two lists are merged into the final sorted list.
- **Quicksort** is a divide and conquer algorithm which relies on a partition operation: to partition an array an element called a pivot is selected. All elements smaller than the pivot are moved before it and all greater elements are moved after it. This can be done efficiently in linear time and in-place. The lesser and greater sublists are then recursively sorted.

Don’t do this

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- etc.



Don't do this

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- Context
- Consistency
- etc.

One message per slide

Only short sentences or phrases

Enough text to follow the story

Not all the details

Do this

Part 1: Slide Design

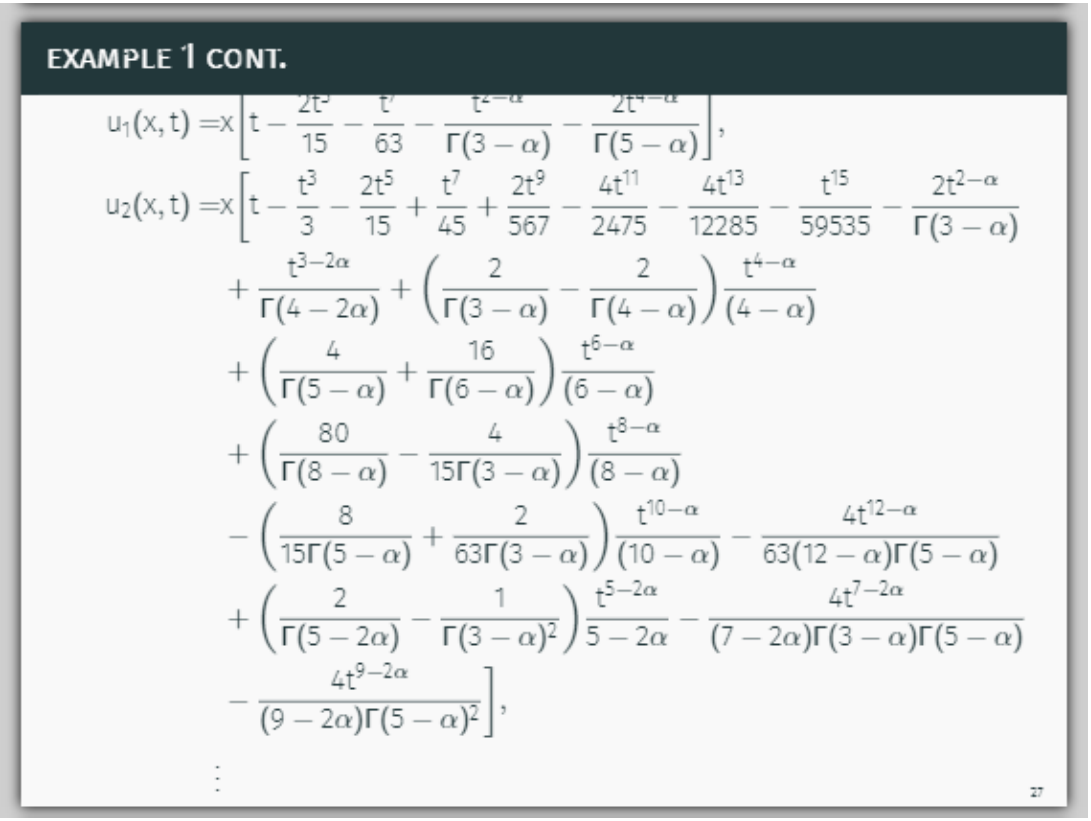
Basic principles of slide design

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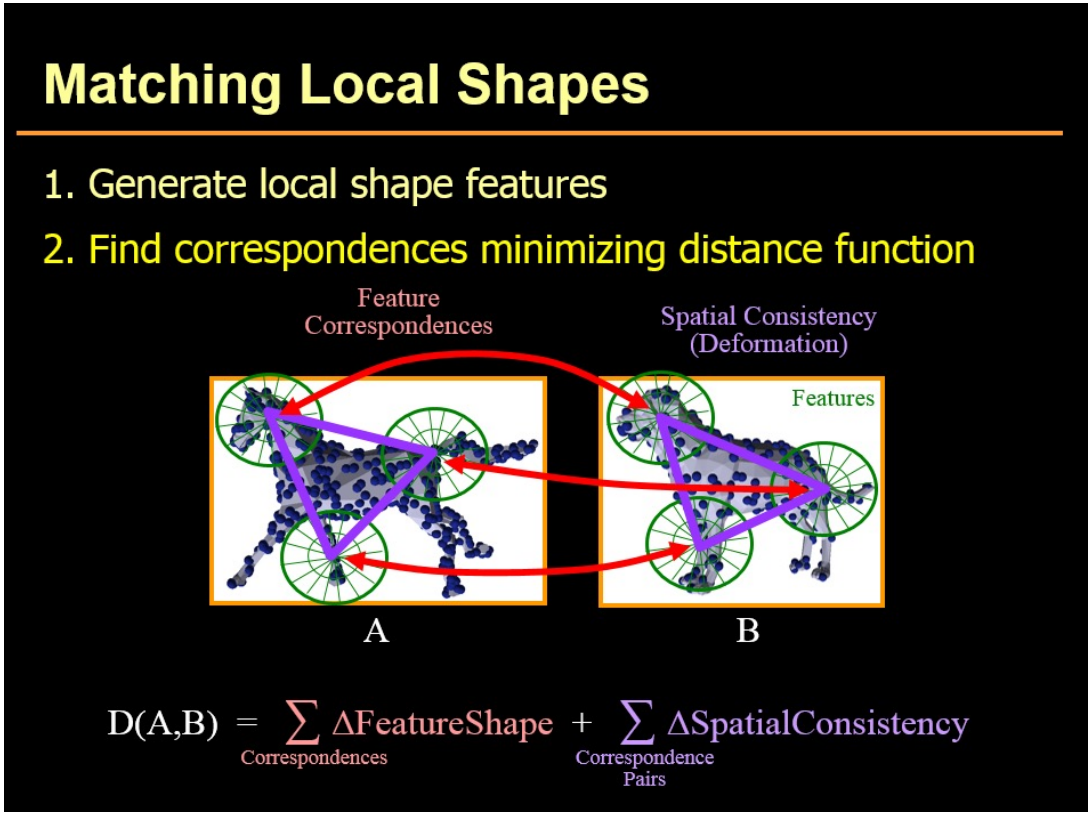


Don't do this
(Unless you plan to define every variable and step through every equation)

Part 1: Slide Design

Basic principles of slide design

- Colors
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- Figures
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- Layout
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- etc.



Do this
(Only include equations
that help tell your story)

Part 1: Slide Design

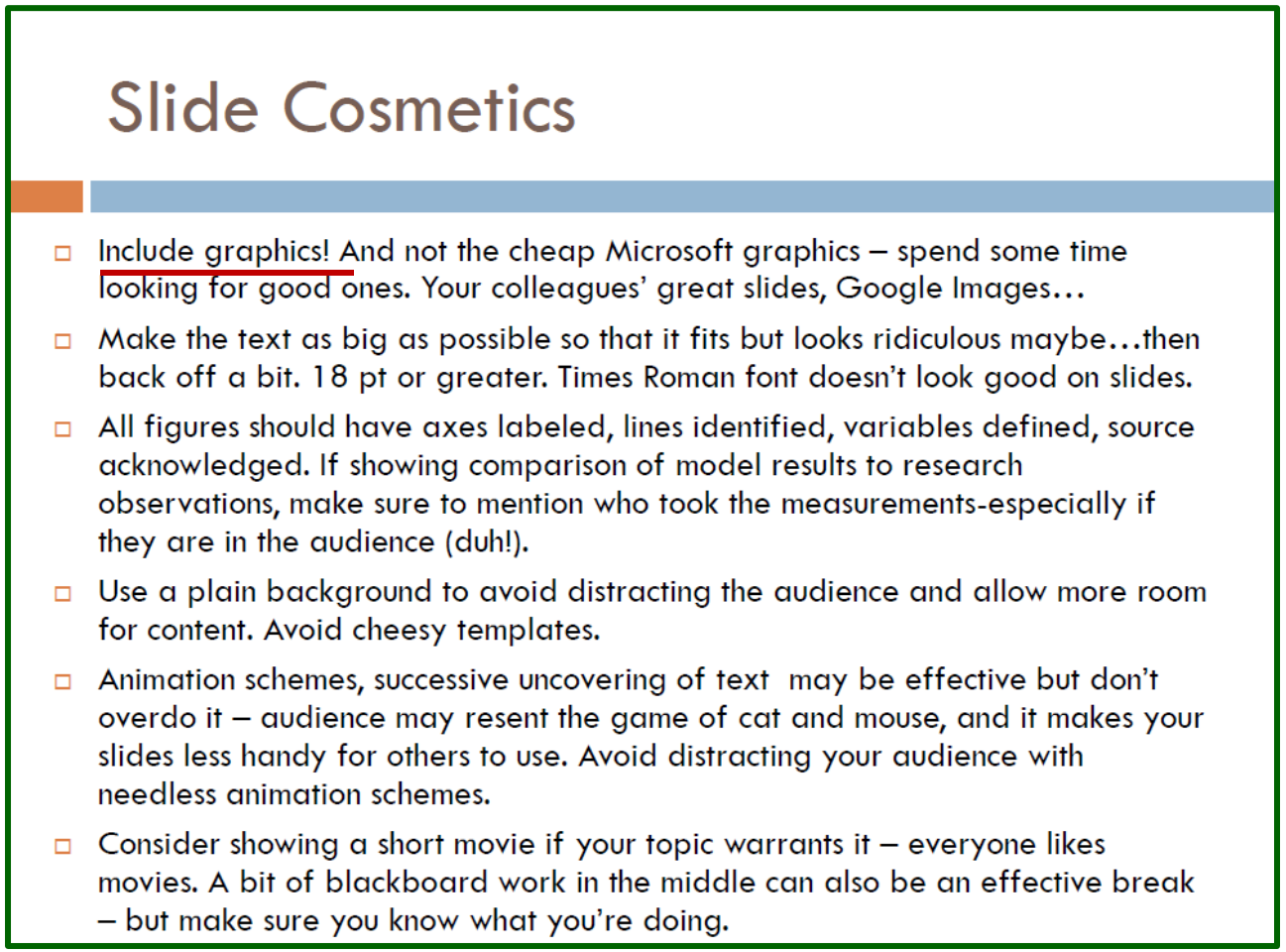
Basic principles of slide design

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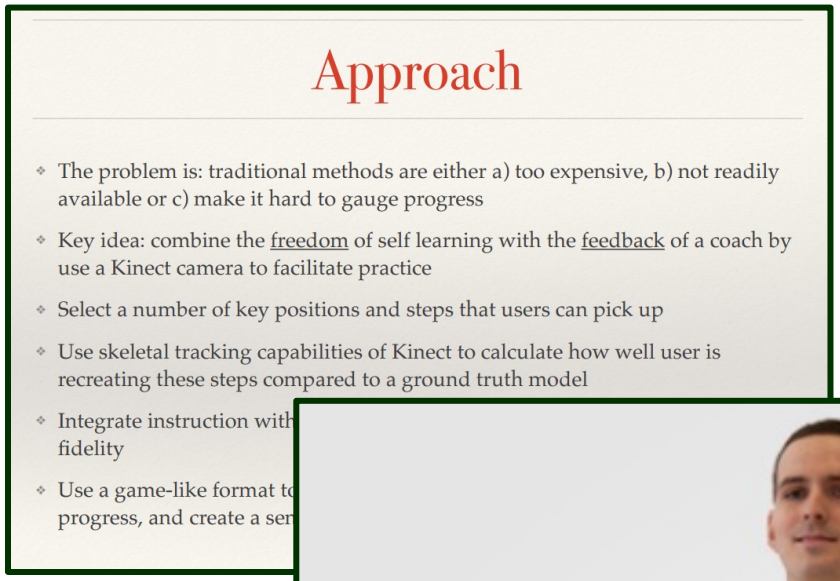


Don't do this

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Do

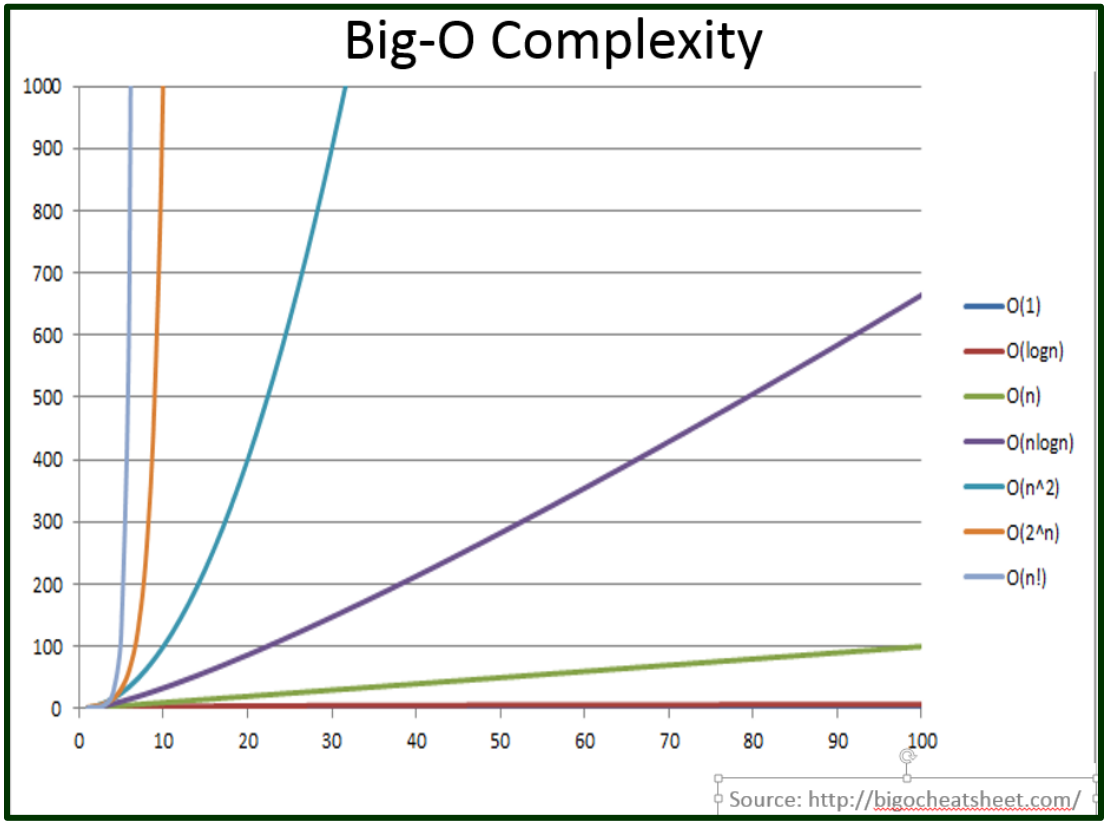


Do this

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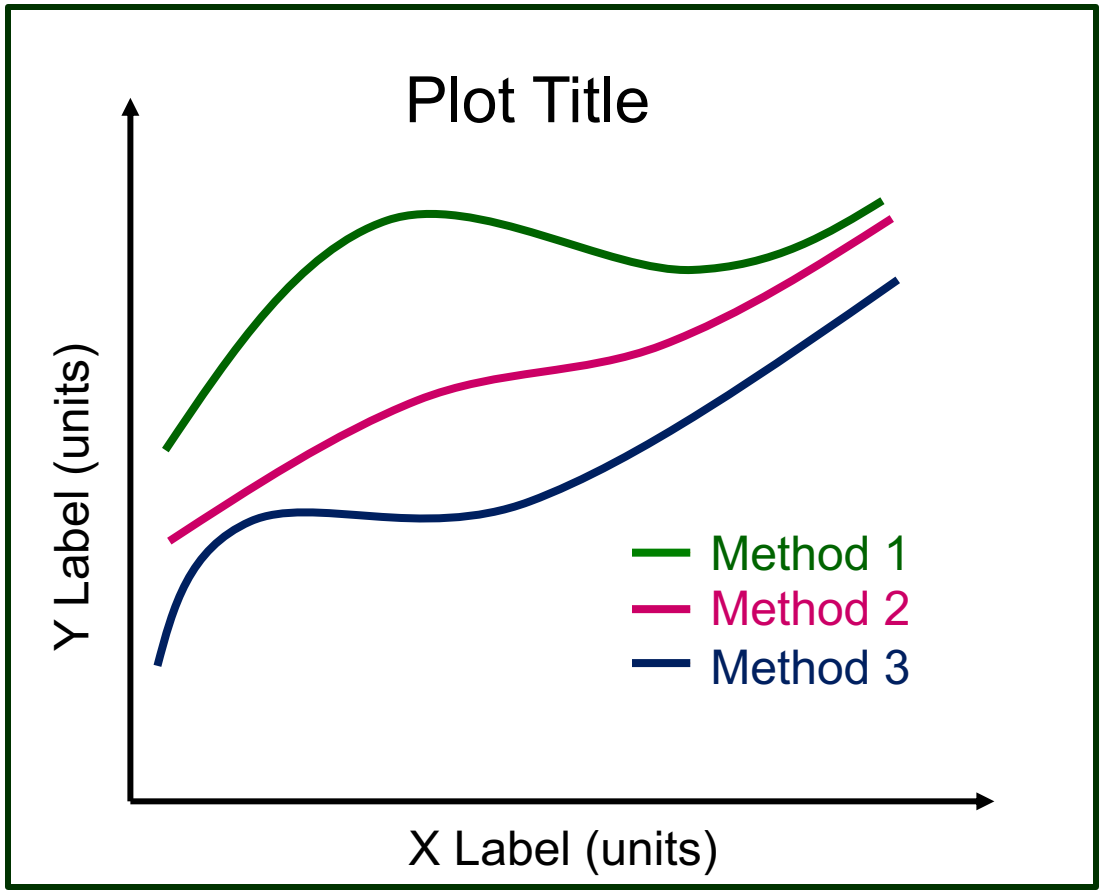


Don’t do this

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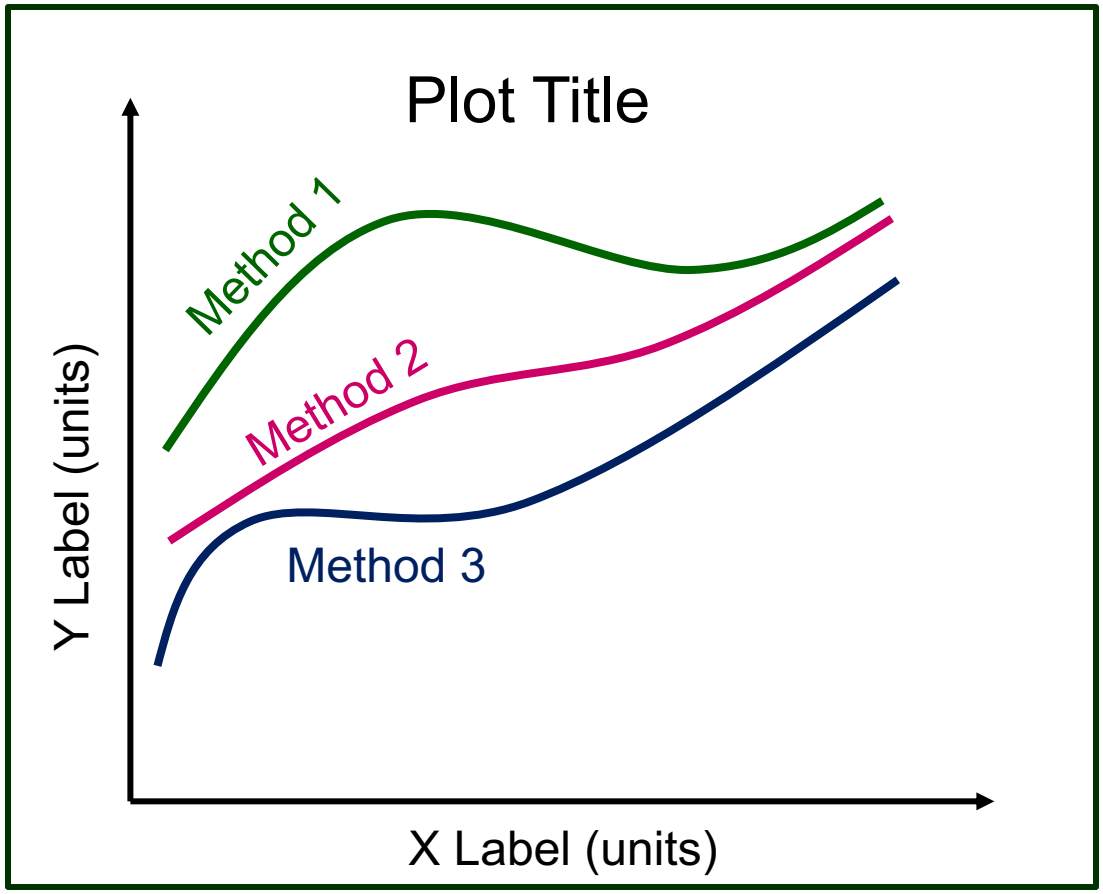


Do this

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Basic principles of slide design

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- etc.



Or even better, this

Part 1: Slide Design

Basic principles of slide design

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Basic principles of slide design

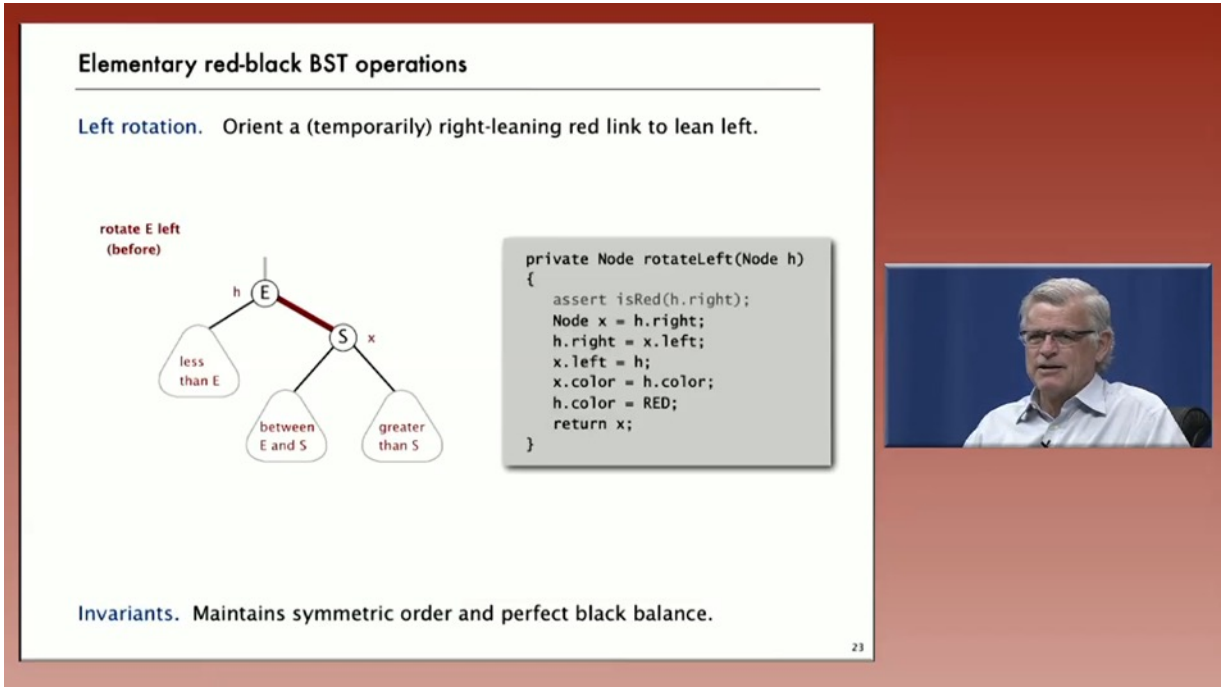
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- etc.

Don’t do this

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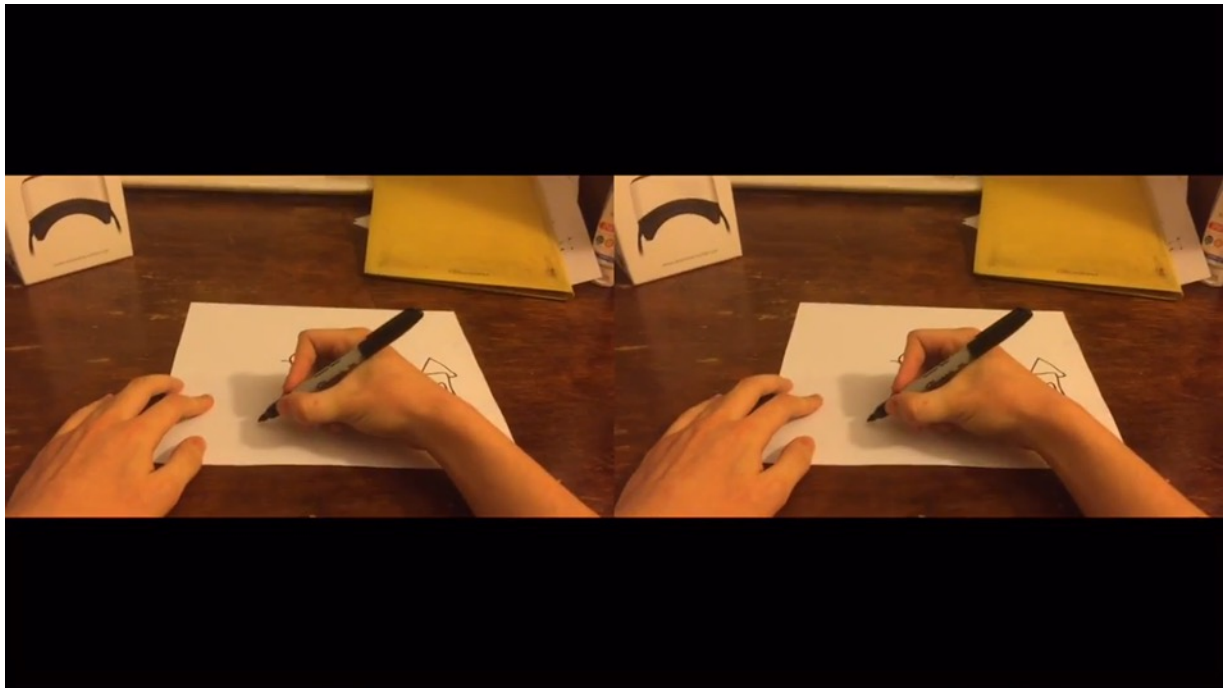
Do this
(animated visualization)

http://www.pptalchemy.co.uk/

Part 1: Slide Design

Basic principles of slide design

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Do this
(demonstration)

Luke Li

Part 1: Slide Design

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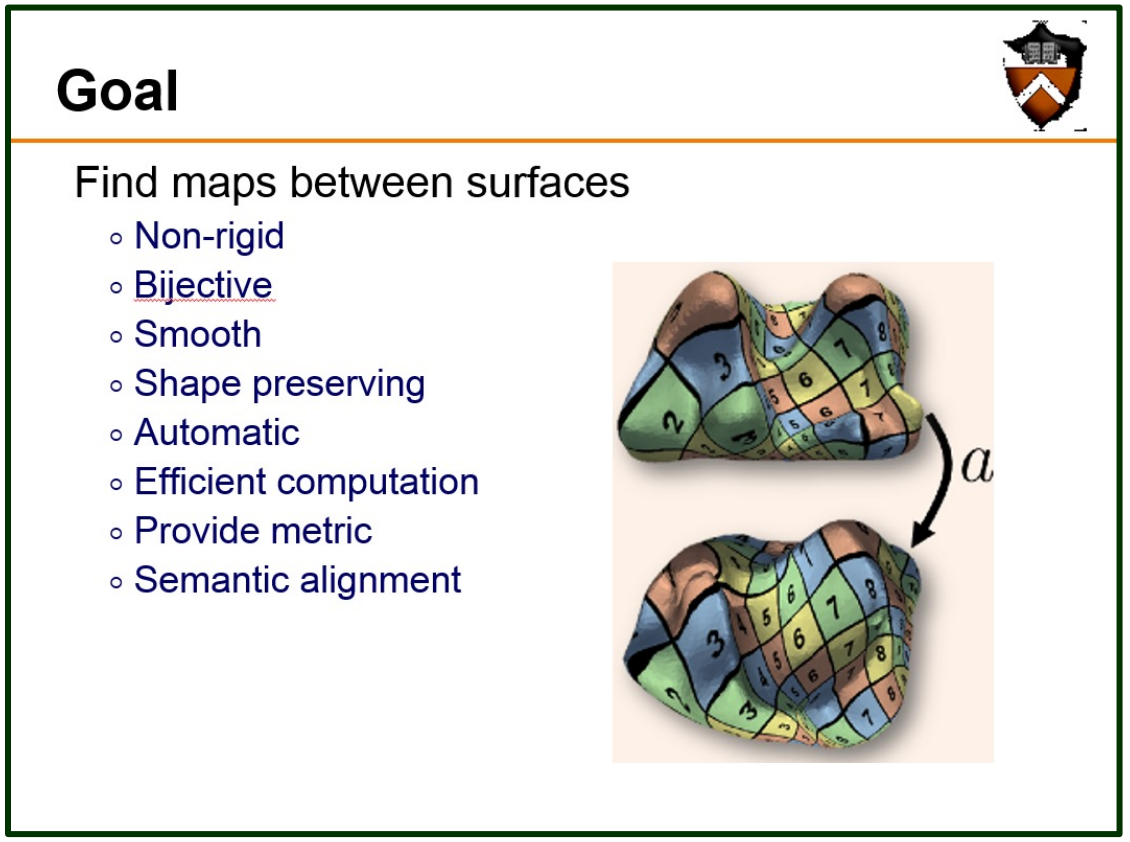


Try to have main point of slide across top,
supporting points in bullets, and
a figure filling most of the slide

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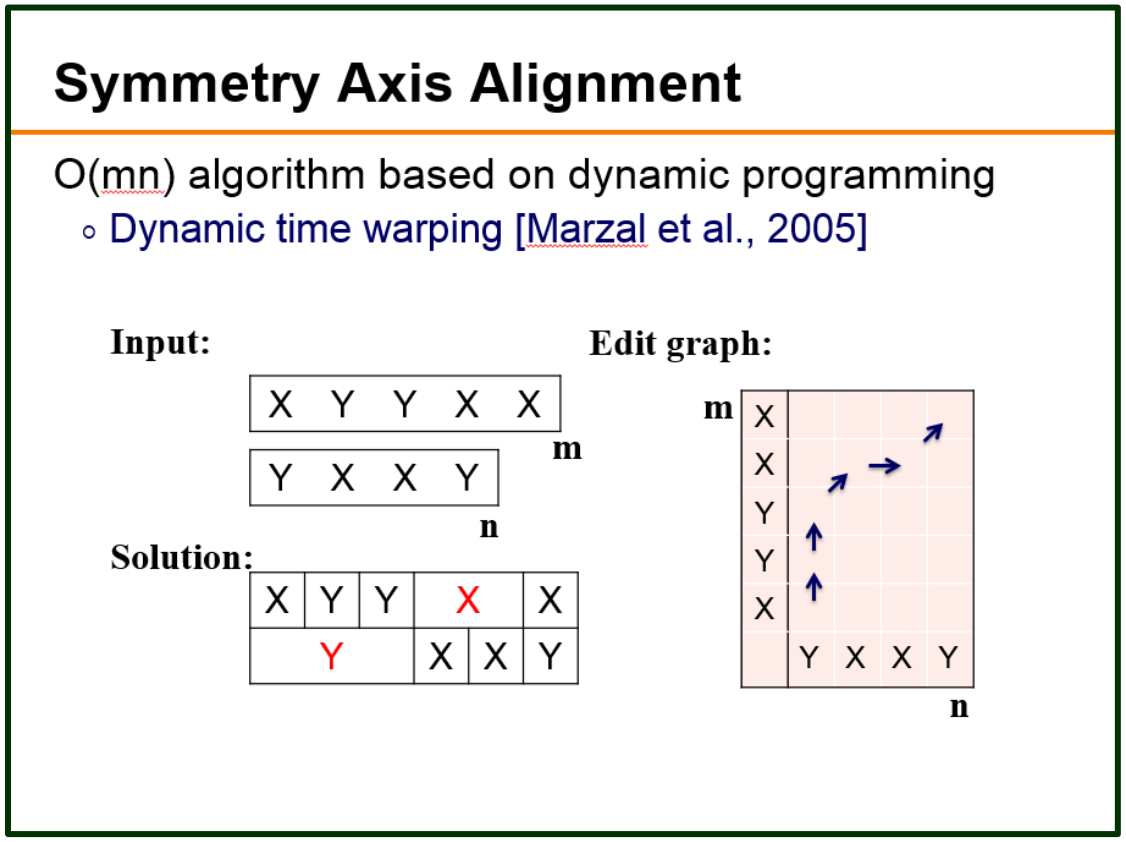


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Timing

Computational complexity:

- $O(F^6 S \log M + N^3 + NFS \log M)$
  - F = # feature points (~5-10)
  - S = # sample points on mesh (128)
  - M = # vertices on mesh (~10K)
  - N = # sample points on axis curve (200)

Computation time, in practice:

- ~1 min for symmetry axis detection (once per mesh)
- ~5 sec for symmetry axis alignment
- ~3 min for correspondence extrapolation

Rarely two points per slide
Rarely more than three sub-levels

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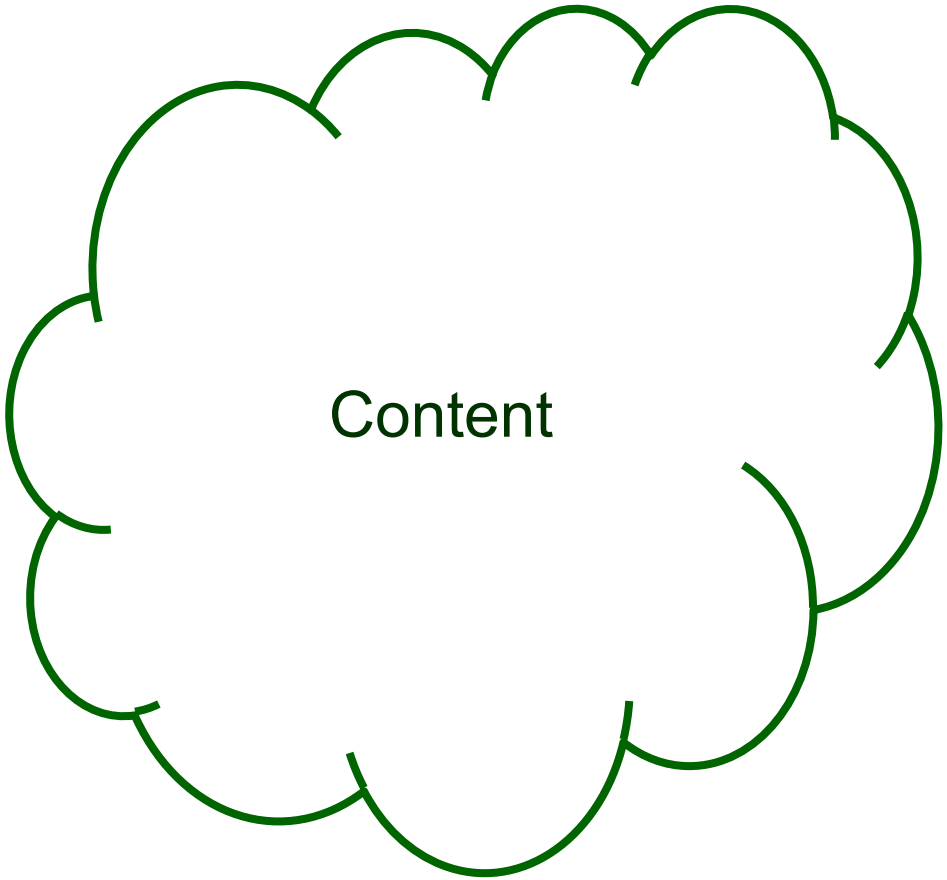
Part of Talk

Basic principles of slide design

Topic sentence

- Colors
- Fonts
- Text
- Equations
- Figures
- Animations
- Layout
- ➢Context
- Consistency
- etc.

Point being discussed



Do this

Part 1: Slide Design

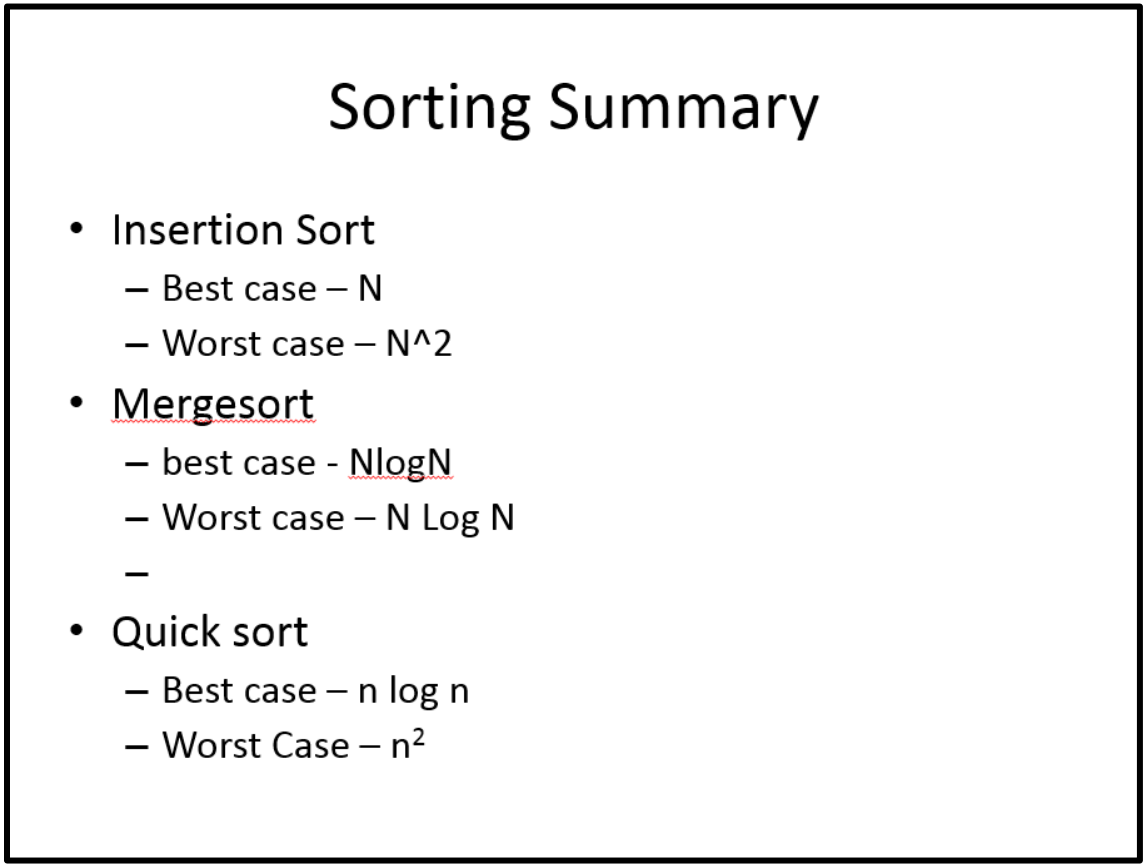
Basic principles of slide design

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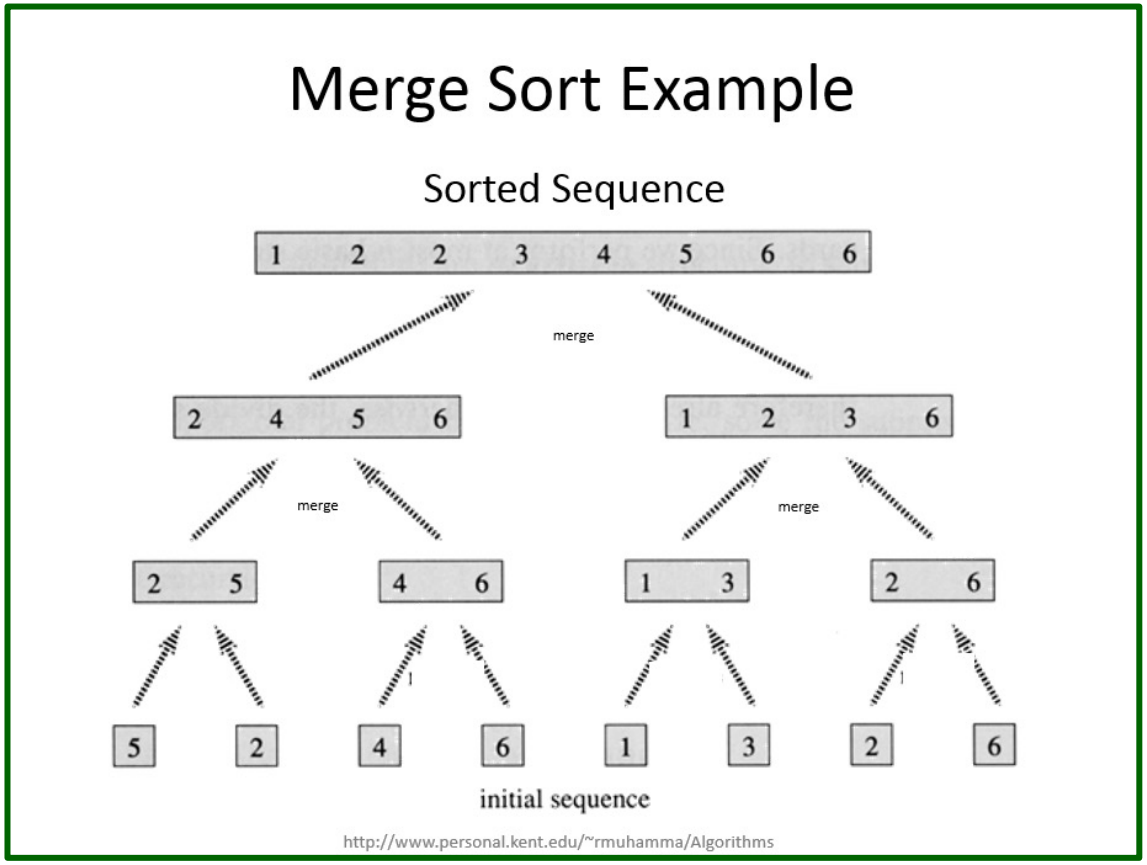


Don’t do this

Part 1: Slide Design

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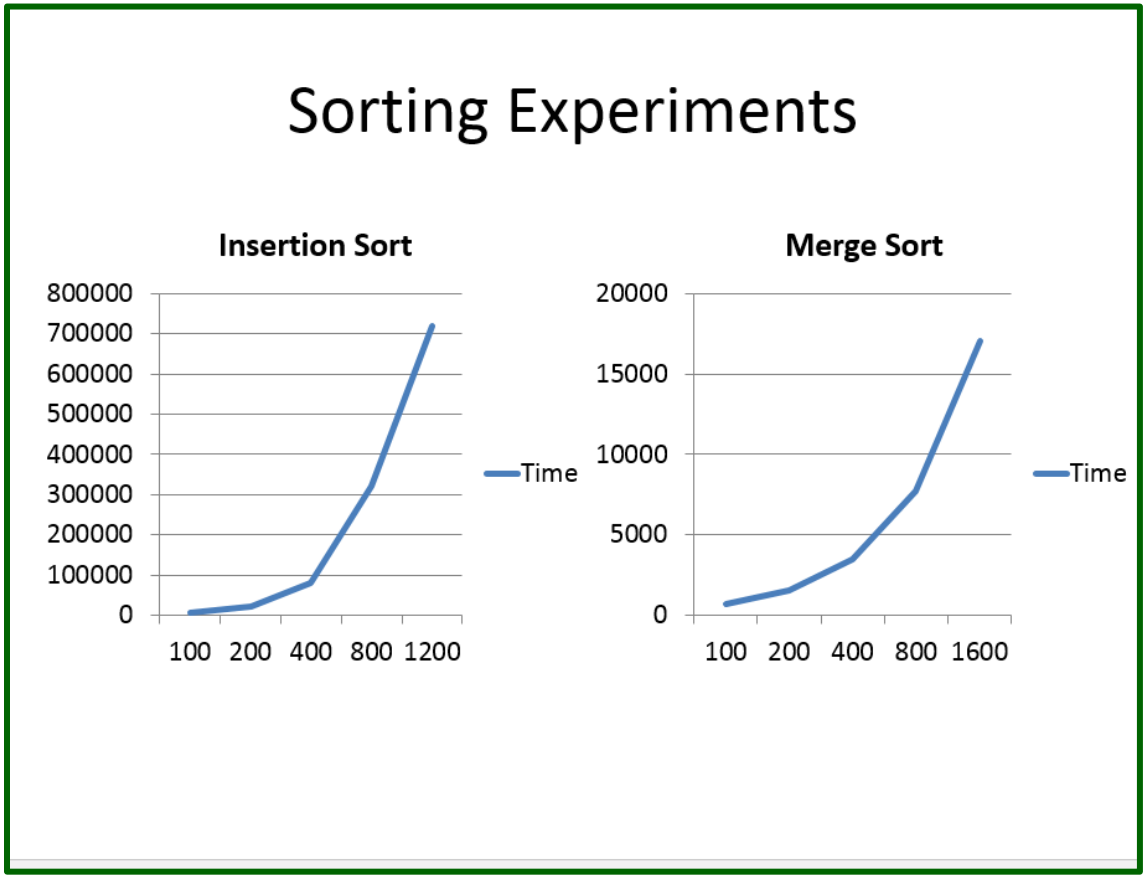


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- etc.



Don’t do this

Part 1: Slide Design

Bonus Fact

- Easy to read slides lower the probability of off-topic questions!
  - *Thinking Fast and Slow* – D. Kahneman



Main takeaway:
Are your slides easy to read?

Plan for this Information Session

Part 1: Discuss basic principles of slide design

- Colors, fonts, text, figures, animations, etc.
- Layouts, context, consistency, etc.

Part 2: Provide a roadmap for how to organize a talk

- Suggest a particular flow of ideas
- Explain why that flow of ideas is good
- Discuss alternatives

Part 3: Suggestions for the presentation

- Understand your audience
- How to speak
- Practice

Part 2: Flow of Ideas

Goal: organize your talk with a flow of ideas that …

- Makes a point
- Teaches the listener something they remember
- Tells a story

Part 2: Flow of Ideas

Goal: organize your talk with a flow of ideas that …

- Makes a point
- Teaches the listener something they remember
- Tells a story with a logical flow of ideas

Flow of Ideas

- Each idea should follow directly from previous one
- Details should be omitted unless necessary for story
  - Level of detail should be tailored to audience

Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
- Goal
- Related work
- Approach
- Implementation
- Results
- Conclusions
- Future work
- Acknowledgments

Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
  - Goal
  - Related work
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  - Conclusions
  - Future work
  - Acknowledgments

Motivation:

- Establish importance of your area or topic

– Why are you doing this?

– What change in the world do you want?

Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
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Goal:

Define problem:

- Specify inputs and outputs
- Define assumptions
- Describe desirable properties
- Provide concrete example(s)

Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
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Related work:

Provide taxonomy of previous approaches to achieve *your goal.*

For each one, briefly describe the key idea and explain why it doesn't achieve your goal completely

Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
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- ➢Approach
- Implementation
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Approach:

Present your novel idea (Eureka!)

Explain why it is a good idea (describe rationale)

Provide simple example showing how your idea achieves your goal in situations that previous approaches would not

Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
- Goal
- Related work
- Approach
- ➢Implementation ←
- Results
- Conclusions
- Future work
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<u>Implementation</u>:

Provide overview:

- System organization
- Sequence of steps (flow chart)

For most important steps (or issues):

- Challenge
- Approach
- Implementation
- Results

Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
- Goal
- Related work
- Approach
- Implementation
- ➢Results ←
- Conclusions
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- Acknowledgments

Results:

Present results of evaluation aimed at testing whether met goal

For each evaluation:

- State goal of evaluation
- Describe evaluation setup
- Describe evaluation metric(s)
- Present results
- Discuss success/failure cases
- Explain implications

Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
- Goal
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- Approach
- Implementation
- Results
- ➢Conclusions
- Future work
- Acknowledgments

Conclusions:

Summarize key points

Restate main results

Describe implications

Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
- Goal
- Related work
- Approach
- Implementation
- Results
- Conclusions
- ➢Future work ←
- Acknowledgments

Future work:

This term: remaining steps, pending evaluations, etc.

Next projects: questions to investigate in a follow-up study

Long-term: how work could affect direction of your field ☺

Part 2: Flow of Ideas

A flow that works for almost any talk:

- Motivation
- Goal
- Related work
- Approach
- Implementation
- Results
- Conclusions
- Future work
- ➢Acknowledgments ←

Acknowledgments:

Sources of code, data, etc.
Student, AI collaborators
Faculty advisor
Funding
etc.

Part 2: Flow of Ideas

Alternatives:

Sure, but if you are reinventing the wheel, it better be good!

Example: Results first followed by how you got there.

$$E=mc^2$$

Plan for this Information Session

Part 1: Discuss basic principles of slide design

- Colors, fonts, text, figures, animations, etc.
- Layouts, context, consistency, etc.

Part 2: Provide a roadmap for how to organize a talk

- Suggest a particular flow of ideas
- Explain why that flow of ideas is good
- Discuss alternatives

Part 3: Suggestions for the presentation

- Understand your audience
- How to speak
- Practice

Part 3: You Are the Expert!

No one knows what you know:

- But your audience is eager to know what you know

Your Job:

- Create the structure of knowledge in your audience's mind that you already have in yours

How you do it:

- Tell them a story that builds, one layer at a time, the edifice of knowledge that you want to create

The Result:

- The audience is happy because it learned something

Part 3: The Curse of Knowledge

No one knows what you know:

- Unfortunately, we forget what it feels like to ***not*** know something we know well

Vocabulary:

- Does your audience know the acronyms, jargon, and terms of art that you are using?

Structure your sentences:

- Link sentences with structural clues like “Although,” “An example is,” “Because,” “This shows,” etc. to enable your audience to follow your logic.

Part 3: How to speak

Establish your presence:

- Introduce yourself and your topic

Do not whisper or shout:

- For a live presentation, you need to reach the person in the last seat, but not beyond

Control the verbal tics:

- Umms, uhs, sniffles, grunts, etc.

Pace yourself:

- Speak conversationally, neither too fast or slow

Part 3: How to speak - Attitude and Body Language

- Look at the audience, but scan, don't fixate
- Smile – Audience relaxes, bits of humor are ok
- Don't be a statue, but this isn't an exercise class
- If time and format permits, allow clarification questions only during the talk. Be polite, but finish.
- Stuff happens – stay calm and deal with it.

Part 3: How to speak

For video presentations (Zoom job interviews too!):

- If the audience sees you, fill the screen
- If the audience sees you, you should be well lit
- Good audio is a must – test ahead of time if you can
- Practice looking directly at the camera
- If purely slides, try to go a little slower, it is ok to repeat a point, it takes longer to understand on video
- If interactive video, pause for questions
- If recorded video, try a few takes and use editing tools

Part 3: Practice, Practice, Practice

Your slides can be improved:

- Share your slides with others and ask for suggestions

Your first talk shouldn't be your final talk:

- Rehearse with a private audience

Ask your practice audience questions:

- Did it make sense?
- Was anything confusing?

Building confidence:

- More repetition leads to talk becoming easier to give

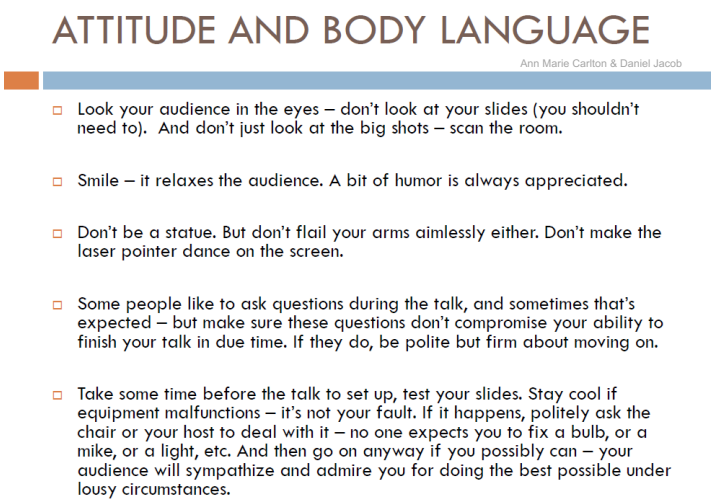
Part 3: Final Thoughts

Giving a talk is an opportunity

- Your chance to describe why what you did is cool!
- Your chance to convince others you are competent
- Why waste that opportunity by giving a bad talk?

Giving a talk does not have to be nerve-wracking

- You know more about topic than your audience
- Preparation and practice is very calming



Summary

Slide design is important

- Colors, fonts, text, figures, animations, etc.
- Layouts, context, consistency, etc.

Probably best to follow suggested flow of ideas

- Motivation, goal, previous work, approach, implementation, results, conclusion, future work
- Same flow used by most top people in the world

Designing effective talks is hard, but important

- Most people are not good at it, mostly because they don’t think about the choices they are making
- You are now above the median in knowledge on this subject ☺

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Thank You!