Technical Research, Writing & Presenting 2.0

CSCI 373

Mike Heroux

Need help?

- Use our AI tools:
  - Have a deep conversation with ChatGPT
  - Ask Gemini to generate one (or many!) research reports for you
- Don't like what you got the first time?
  - Ask again, and again, and again.
- Not sure how to ask?
  - Ask how to ask!

If you find one good resource

- Look at its bibliography, notes, resources
- Go to the library site, find the article and click on the link that finds article that cite that article
- Find the authors' websites and look for other papers they have published
- And iterate with anything new you find
- Soon, you will have a good collection of related resources

Signs you are becoming an expert

- You have read, viewed, and listened to *many* resources: Dozens, not 10, 15

- When you find a new resource, it covers ideas you have already encountered and builds upon your existing understanding

- When you read, view, or listen to a resource:
    - A new, novel idea comes to mind
    - A new or more elaborate mental model emerges

Labels

\label{label_name} and \ref{label_name}

```
\section{Figures}

\begin{wrapfigure}{r}{0.25\textwidth}

\centering
\includegraphics[frame, scale=0.1]{LaTeX_Lion.pdf}
\caption{\footnotesize This figure is drawn from a PDF file that
was included, scaled and inserted into wrapped text.  Use the \LaTeX\
source as a starting point for inserting your own figures.}
\label{fig1}

\end{wrapfigure}
Inserting figures into \LaTeX\ documents can be complicated.  One strategy
(which is a good general strategy for working with \LaTeX\ documents) is to refer
to existing documents as templates for specific types of constructs.  For
example, you can refer back to this document to see how Figure~\ref{fig1} is
expressed in \LaTeX\ source code. Web searches are also an excellent
resource for getting detailed information about \LaTeX\ strategies.  You don't
have to struggle alone in trying to get \LaTeX\ to work!
```

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Terms, Concepts, Procedures

Use lists

```latex
\section{The Body--Defining Terms, Concepts, and Procedures using Lists}

Use bulleted and enumerated lists to define terms, concepts, and procedures to
help your reader learn and later reference important content.  For terms and
concepts use the \texttt{itemize} environment:
\begin{itemize}
    \item \textbf{Term:} Usually a noun with specific technical meaning.  Use 2--3
    sentences even if your text provides a fuller description.
    \item \textbf{Concept:} Often 2--3 words that you use as short-hand for
    describing an idea.  Similar to a term.  Also use 2--3 sentences to describe
    it for later reference.
    \item \textbf{Procedure:} Any step-by-step process, including algorithmic
    sketches or workflow processes.
\end{itemize}

To create lists we show, by example, what procedure to use:
\begin{enumerate}
    \item \textbf{Choose the kind of list:} Use the \texttt{itemize} environment
    for terms and concepts.  Use the \texttt{enumerate} for procedures
    \item \textbf{Use bold text to list each item:} List each term, concept or
    step as an \texttt{\\item} followed by a colon character ``:''
    \item \textbf{Provide a brief description:} For each item, provide a 2--3
    sentence description, even if you provide a more detailed description in the
    main text
    \item \textbf{End each description with or without a period:} Be consistent in
    the use of a period ``.'' or not at the end of each description.
\end{enumerate}
```

IV. THE BODY–DEFINING TERMS, CONCEPTS, AND PROCEDURES USING LISTS

Use bulleted and enumerated lists to define terms, concepts, and procedures to help your reader learn and later reference important content. For terms and concepts use the itemize environment:

- **Term:** Usually a noun with specific technical meaning. Use 2–3 sentences even if your text provides a fuller description.
- **Concept:** Often 2–3 words that you use as short-hand for describing an idea. Similar to a term. Also use 2–3 sentences to describe it for later reference.
- **Procedure:** Any step-by-step process, including algorithmic sketches or workflow processes.

To create lists we show, by example, what procedure to use:

1) **Choose the kind of list:** Use the itemize environment for terms and concepts. Use the enumerate for procedures
2) **Use bold text to list each item:** List each term, concept or step as an item followed by a colon character ":"
3) **Provide a brief description:** For each item, provide a 2–3 sentence description, even if you provide a more detailed description in the main text
4) **End each description with or without a period:** Be consistent in the use of a period "." or not at the end of each description.

Spacing using ~

Use ~:

- In Smith and Jones~\cite{2014SmithJones}, we see that …

- In Section~\ref{intro}, …

- In Figure~\ref{fig1}, …

Figures

Figures:

- Graphs:
  - Clearly label units, legend, title

- Captions:
  - Explain the figure in summary
  - 2-3 sentences that tell the story of the figure

Inserting figures into LaTeX documents can be complicated. One strategy (which is a good general strategy for working with LaTeX documents) is to refer to existing documents as templates for specific types of constructs. For example, you can refer back to this document to see how Figure 1 is expressed in LaTeX source code. Web searches are also an excellent resource for getting detailed information about LaTeX strategies. You don't have to struggle alone in trying to get LaTeX to work!

Fig. 1. This figure is drawn from a PDF file that was included, scaled and inserted into wrapped text. Use the LaTeX source as a starting point for inserting your own figures.

Tips for Writing Strong Stand-Alone Captions

- Start with context: What is being shown and why?
- Describe the method or metric: How was the data obtained or calculated?
- Interpret the result: What should the reader take away?
- Reference if needed: Optionally tie to the main text for deeper details.

See this webpage:
https://maherou.github.io/Teaching/files/CS373/CaptionsThatWork/

Wide figures

- Spreading a figure across two columns
  - Use figure*

To spread a figure across two columns:

Use the figure* environment. So instead of

\begin{figure}[ht]
\centering
...
\end{figure}

you should use

\begin{figure*}[ht]
\centering
...
\end{figure*}

This also works for tables (i.e. table*).

Writing Rules

Rule #7:

- Use pictures, charts and graphs,
- But keep in mind #4 (Simplicity).

Rule #8: Use examples to explain complex ideas.

Rule #9: Use:

- Headings (Chapter, Section, etc.).
- Bulleted Lists.
- Numbered lists.

to provide structure, clarity and conciseness to your document.

Rule #10: Provide guidance :

- Table of Contents.
- List of Figures, list of Tables.
- Index and Glossary.
- Abstract.
- Note: LaTeX provides these!

Slide Guidelines

1. Let us read the data.

2. Use diagrams, charts, figures.

3. Intersection: minimal.

   What you say / What is on your slides

4. Prepare for disaster.

5. If slides are big notecards, don't have slides.
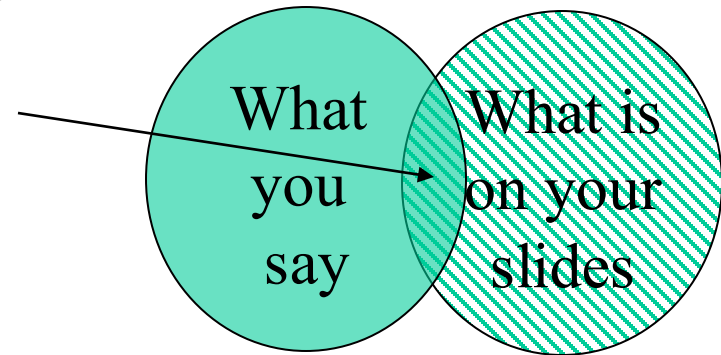
Put Details on Slides

DOE Oak Ridge Exascale System Frontier Specs.

Peak Performance	>1.5 EF
Footprint	> 100 cabinets
Node	1 HPC and AI Optimized AMD EPYC CPU 4 Purpose Built AMD Radeon Instinct GPU
CPU-GPU Interconnect	AMD Infinity Fabric Coherent memory across the node
System Interconnect	Multiple Slingshot NICs providing 100 GB/s network bandwidth Slingshot dragonfly network which provides adaptive routing, congestion management and quality of service.
Storage	2-4x performance and capacity of Summit's I/O subsystem. Frontier will have near node storage like Summit.

Create Timelines

http://www.excel-board.com/how-to-create-timeline-chart-in-excel-quickly-and-easily/
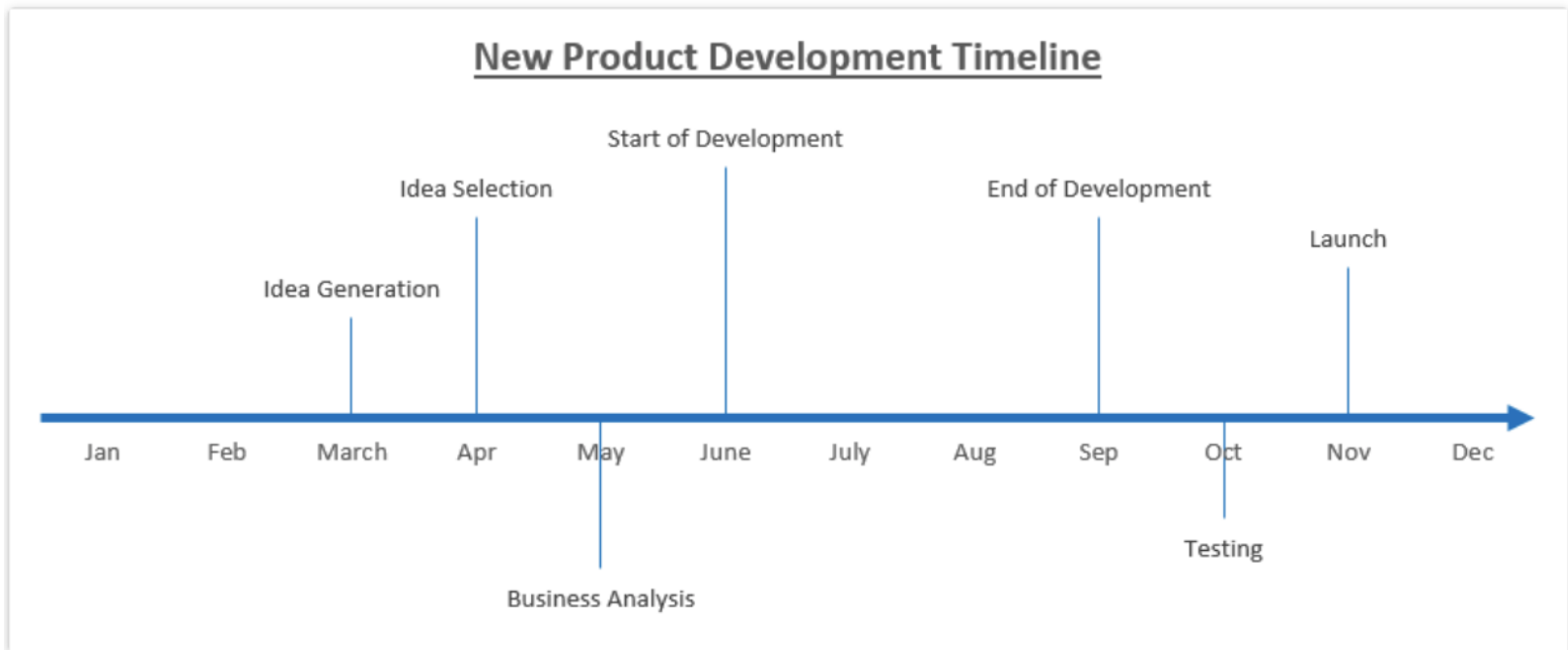
PowerPoint Defaults

- The default format for PowerPoint is:
  - Outline Format.
  - Brief statements.
  - Slide is a big notecard for the speaker.
- This is BAD:
  - Credible argument:
    - Problems with space shuttle O-rings were known.
    - Poor PowerPoint hid the issue.
    - NASA Challenger exploded in 1986.
  - The best default for a new PowerPoint slide?