

# **CSE570**

## **Project Guidelines**

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**These slides are available on-line at:**

**<http://www.cse.wustl.edu/~jain/cse570-21/>**

**Student Questions**



- ❑ Outline: Preparation Process, Mind Maps
- ❑ Writing: Organization, List of Acronyms, References
- ❑ HTML Style Guidelines
- ❑ Draft Submission
- ❑ Final Submission

## Student Questions

# HTML Style Guidelines

- ❑ See papers from previous classes on my website for details
- ❑ Use plain text editors with simple html
- ❑ No Java, flash, animation
- ❑ Do not use HTML generated by MS Word. It will not pass any HTML validation test. Save the word file as plain text and add HTML tags.
- ❑ Learn to use special characters in text and reference URLs. See
  - [http://www.w3schools.com/tags/ref\\_urlencode.asp](http://www.w3schools.com/tags/ref_urlencode.asp)
  - <https://perishablepress.com/stop-using-unsafe-characters-in-urls/>
- ❑ HTML5 only

## Student Questions

# Header

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<title> </title>
<meta name="author"
<meta name="robots"
<meta http-equiv="content-type" content="text/html; charset=utf-
8">
<meta name="keywords"
<meta name="description"
</head>
```

## Student Questions

- What is the difference between the title label and the head label?

*Head=Header of the file. It is a section. It tells search engines and browsers about the document*

*Title = Title of the document. It is just a single line. It tells the reader about the content.*

- Is there any requirements of the coding format or writing style, like indentation ?

*No.*

# Body

```
<body>
```

```
<h1>Title</h1>
```

```
<B>Author</B>, Permanent-Email
```

```
<hr>
```

```
<h2>Abstract:</h2>
```

```
...
```

```
<hr>
```

## Student Questions

## Body (Cont)

<h2><a id="toc"></a>Table of Contents:</h2>

<ul>

<li><a href="#sec2">2. 10-Gigabit Ethernet Overview</a></li>

<ul>

<li><a href="#sec21">2.1 Benefits of 10-Gigabit  
Ethernet</a></li>

...

</ul>

</ul>

<hr>

## Student Questions

## Body (cont)

```
<h2><a id="intro"></a>Introduction</h2>
```

...

```
<p>[<a href="#grow99">Grow99</a>]
```

```
<p>
```

...

```
<br>
```

## Student Questions

# Project Homework 2

- ❑ Prepare a short webpage (written manually) using most of the tags indicated in this handout
- ❑ Include one image/photo and a table in the page
- ❑ Validate the page using a trial version of CSEHTML from: <https://www.htmlvalidator.com/>
- ❑ Check the Google-friendliness of the page: <https://varvy.com/>
- ❑ Submit the html source file printout, web page printout, and the URL, screenshot of validation
- ❑ Remember:
  - To add all meta tags specified in the handout
  - Validate the page. Capture a screenshot and attach.
  - Load it in an ad-free area

## Student Questions

- ❑ What if the free trial expires before I finish my project? Do I need to buy a license?  
*Free trial is for 30 days. You do not need to buy a license.*
- ❑ Should we put all files on a cloud server like aws , gcp to keep it accessible at any time?
- ❑ *No. WUSTL location is best since it is free and no advertisements.*
- ❑ Can we use CSS and JavaScript?  
*CSS, yes. No JavaScript.*
- ❑ In addition to the HTML format requirement, is there any recommendation/requirement on the format of the text itself? e.g. font, indentation, spacing, etc.

*No requirements, but use common sense. Blank lines between paragraphs help. Centering a figure is required. Spaces before and after a figure and table is required. Tables should not overflow when printed on a normal letter-size paper.*



# WUSTL Engineering Student Webpages

- ❑ IT will create the URL:  
`https://students.engineering.wustl.edu/cse570_f119`  
`/<wustlkey>`
- ❑ For example:  
`https://students.engineering.wustl.edu/cse570_f119 /jain/`
- ❑ On Linux this corresponds to:  
`/project/academic-www/cse570_f119/(wustlkey)`
- ❑ From `shell.cec.wustl.edu`, or from Windows/MAC at  
`\\nfs.seas.wustl.edu\seaslab\academic-`  
`www\cse570_f119\<wustlkey>`  
using WUSTL Key authentication.

## Student Questions

- ❑ What is the updated link to our WUSTL webpages?

*TBD*

# Submission Instructions

1. Prepare the page in your own computer in a separate directory.
2. The main file should be called index.html
3. Use no other subdirectory in this directory. All supporting files such as CSS, figures, etc. should be in the same directory.
4. Validate the page for correctness using CSE HTML Validator.
5. One way to produce the validation report is to:
  - Validate again using Tool-> Batch wizard.
  - Validate.
  - It will open a browser page with the report.
  - Click on the file name to see the detailed report for the page.
  - Print/save this report with the name validation.pdf in the same directory
6. Do not worry if there are some warning and comments such as spelling mistakes or keyword meta tag.
5. Zip the directory and upload the zip file to canvas.

## Student Questions

- In min 25:53 slide 11 appears on top of slide 10.

# Common Mistakes in Homework 2

- ❑ Not using parameters for meta tags
- ❑ Not validating
- ❑ Not uploading the image file

## Student Questions

# Outline Preparation Process

- Read abstract and stop if irrelevant
- Underline the key points in the paper
- Write the key summary on the first page of the paper
- Prepare a text document with the key ideas
- Keep adding to this text document from different papers with [refs, page, paragraph]
- Import the text document in PowerPoint
- Add figures and clean up the outline
- Like getting ready to make a presentation to the class

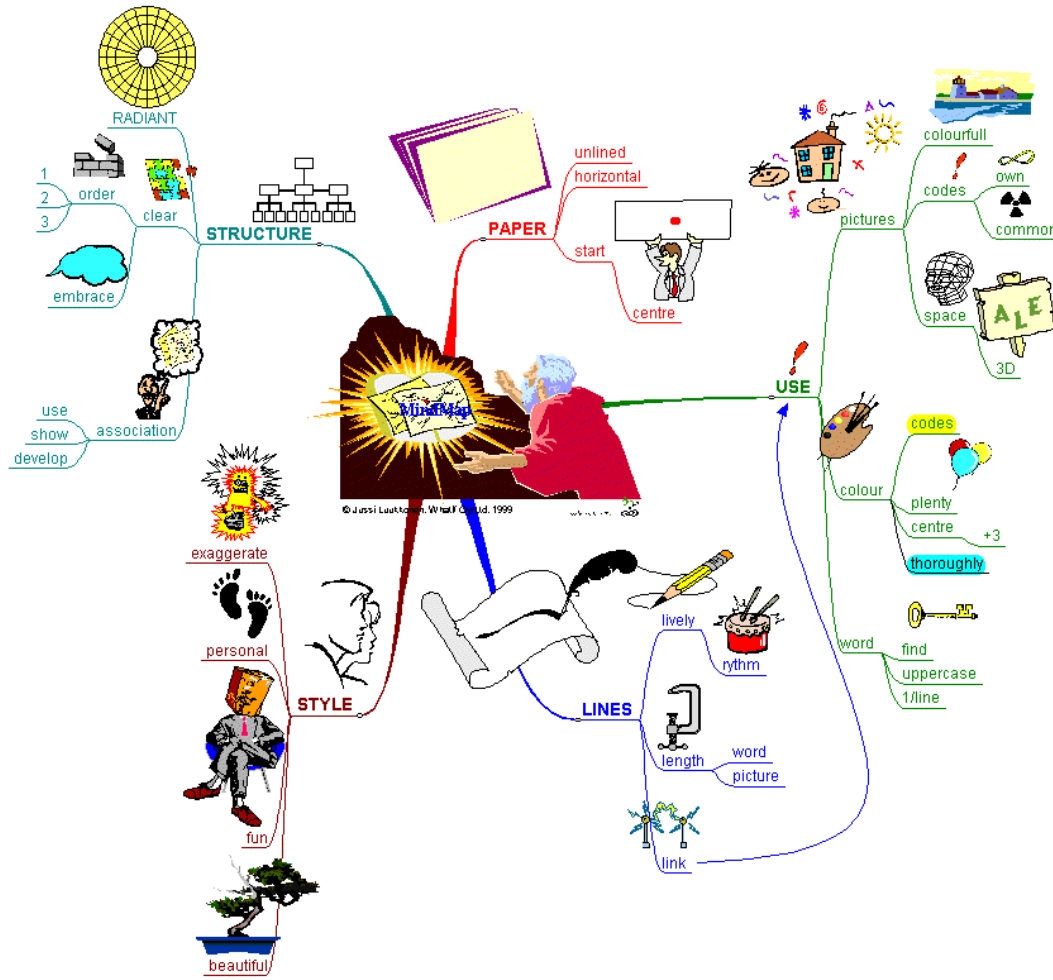
## Student Questions

- So, we need to have a ppt, right?

*It is not required but recommended. No points will be deducted for how you prepared the outline.*

- Could you please show us some examples of a few slides in PowerPoint?

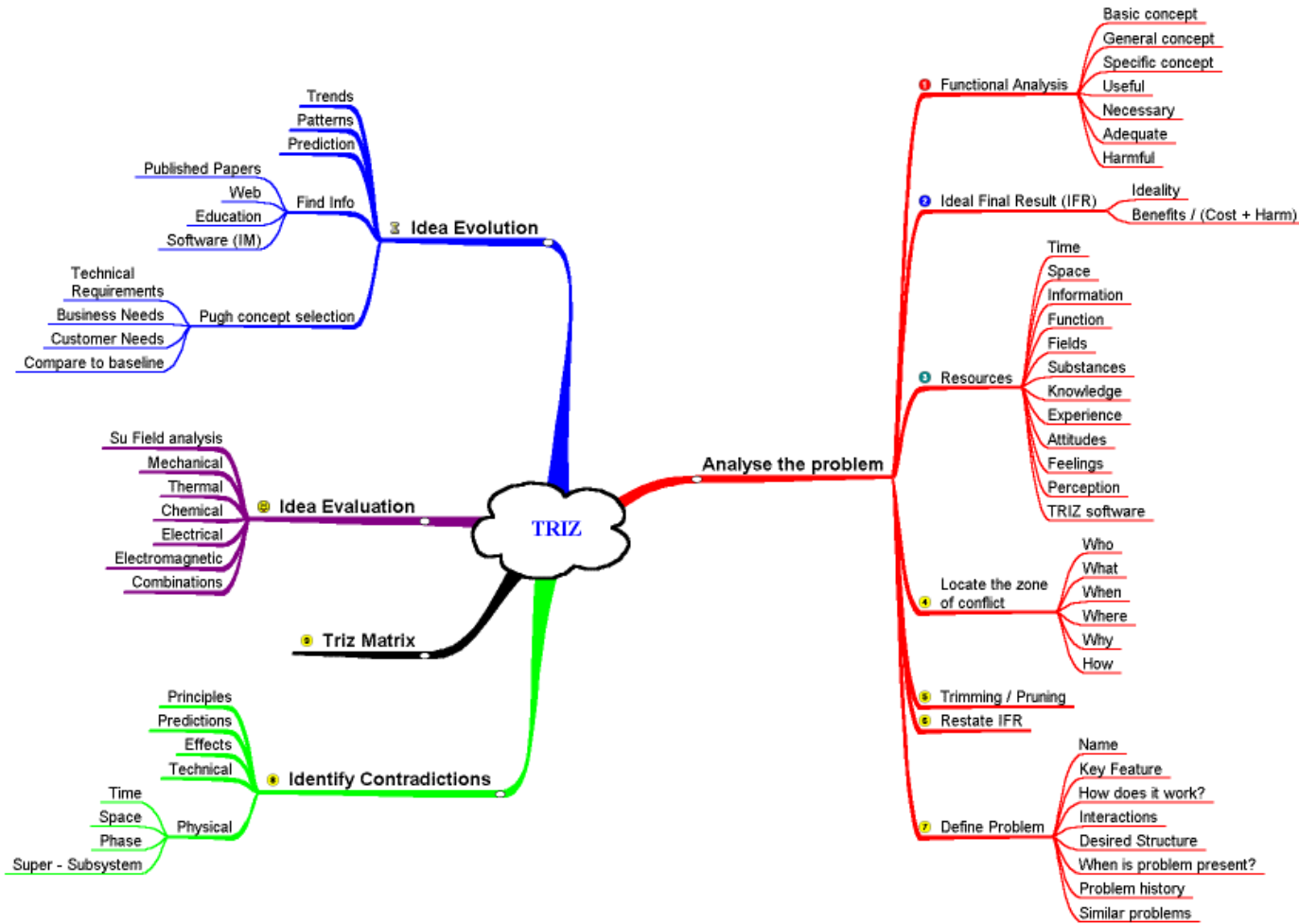
# Mind Maps



## Student Questions

What is the recommended mind maps software?  
*Have not tried any software. I do it manually. Please recommend if you find one.*

# Mind Maps (cont)



## Student Questions

# Project Homework 4: Outline

- ❑ Read papers
- ❑ Collect ideas
- ❑ Organize them in a linear list
- ❑ Present them in a PowerPoint Presentation

## Student Questions

- ❑ The slides appear to jump from Project Homework 2 to Project Homework 4, is there another homework missing from the slides?

*Project Homework 3 is references. It is not mentioned here but will come after PHW2 and before PHW4.*

# Sample Outline

## Paper Outline

Justin Deters

1

## Goals & System

- **System:**
  - Cilk runtime on Adams computer
  - 4 socket NUMA machine
  - Vanilla runtime vs Locality aware runtime
- **Goals:**
  - Show that the locality aware runtime has better performance
    - Better speed up
    - Less cache misses
    - Less remote memory accesses

2

## Services & Outcomes

- **Services:**
  - General processing
  - Distributed memory
  - Caching
  - Remote access to memory
  - Distributed computation
- **Outcomes:**
  - Assuming there's no bugs in the processor or chipset, all of these should function correctly.
  - If there is failure, the system should respond erratically

3

## Metrics

- Execution time
- Parallel speed up
- Number of cache misses
  - Serviced by cache to cache
  - Serviced by Local DRAM to cache
  - Serviced by Remote DRAM to cache
- Ratio of remote vs local memory access

4

## Parameters

- **System parameters:**
  - Clock speed
  - Cache size
  - CPI speed
  - Memory size
- **Workload parameters:**
  - Type of runtime
  - Division of work in the computation
  - Size of input
  - Utilization of parallel structures

5

## Factors

- **Factors:**
  - Type of runtime
  - Benchmarks
- **Levels:**
  - Type of runtime:
    - Vanilla runtime
    - Locality runtime
  - Benchmarks
    - 6 benchmarks
    - 3 input sizes for each benchmark

6

## Evaluation Technique

- The vanilla runtime, locality runtime, and the benchmarks have all been implemented.
- This allows us to complete direct experimentation rather than an analytical model, or simulation.

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## Workload

- **Benchmarks:**
  - Cillsort, Heat, Heat\_v, Mat\_Transpose\_4\_way, Matmul\_4\_way\_rm, Matmul\_4\_way\_z
- **Input size**
  - Three separate input sizes:
    - Tiny, small, large
  - Tiny and small should be able to fit into L3 cache
  - Large should be too large to fit into L3 cache

8

## Experiments

- We will use a full factorial design.
- Due to the fact that everything is implemented and the process of running and varying the workloads can be automated, it's possible to use a full factorial design.
- Data collection is also automated as well.

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## Student Questions



# Sample Outline (Cont)

## Analysis

- Perform confidence interval tests to determine if the locality runtime is statistically better than the vanilla runtime.

10

## Literature Review

11

## Main memory and cache performance of intel sandy bridge and AMD bulldozer

- Summarizes the layout of the Sandy Bridge EP.
  - This includes the cache hierarchy
  - Also shows where the memory controller and CPI interact with L3
- Includes their own approach to measuring latency between different types of cache accesses both local and remote

12

## The implementation of the Cilk-5 multithreaded language

- Defines the structure of the Cilk runtime
- Explains the basics of work-stealing
- Gives theoretical bounds on the computation

13

## NUMA (Non-Uniform Memory Access): An Overview

- Summarizes the NUMA architecture
- Details the different types of memory policies one can use in a NUMA machine
- Details how Linux handles NUMA machines

14

## "(Mis)understanding the NUMA memory system performance of multithreaded workloads

- Clarifies misunderstandings of NUMA systems
- Provides experimental demonstrations of how programs interact with NUMA
- Explains the strategy of locality aware computation on NUMA machines

15

## Scalable Task Parallelism for NUMA

- An implementation of a locality aware NUMA runtime
- Defines task parallel computations on NUMA machines
- Proposes a locality aware memory allocation protocol

16

## Topology-Aware and Dependence-Aware Scheduling and Memory Allocation for Task-Parallel Languages

- Proposes a solution to the NUMA locality problem by focusing on scheduling dependent tasks on the same nodes
- Proposes that memory should be allocated on nodes by grouping tasks together that will all depend on the same memory

17

## Parallel Work Inflation, Memory Effects, and their Empirical Analysis

- Defines the concept of "work inflation"
- Work inflation is the cost incurred going from a single core operation to a multicore operation
- Provides a theoretical framework for work inflation
- Offers guidelines on how to optimize to reduce work inflation

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## Student Questions

# Sample Outline (Cont)

## Roofline

- Provides an analysis framework for performance on multicore systems
- Proposes the roofline model
  - Allows one to visualize system performance over operational intensity
  - The roofline shows where the performance levels out once the system has been saturated
- Allows programmers to better optimize their programs to avoid hitting the roofline

19

## Likwid

- A performance monitoring suite
- Allows easy access to the Intel hardware performance monitoring counters
- Gives programmers an easy way to define specific performance monitoring situations and evaluate their programs

20

## Intel 64 and IA-32 Architectures Software Developer's Manual

- A detailed manual on the different features and performance monitoring abilities of Intel processors
- Specifically outlines the bit masks used to define which feature you are monitoring.

21

## Intel Xeon Processor E5 Product Family Specification Update

- This document outlines all the bugs within the Sandy Bridge EP architecture that need to be accounted for during performance monitoring

22

## Using Intel Vtune Amplifier XE on Xeon E5 Family 1.0

- A presentation by Intel that outlines various suggestions on performance monitoring
- Specifically includes the measurement formula of "back end stall" or cycles spent on servicing cache misses

23

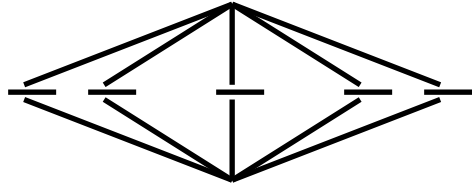
## LIKWID: A Lightweight Performance-Oriented Tool Suite for x86 Multicore Environments

- The academic paper that outlines the Likwid suite

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## Student Questions

# Diamond Writing Style



- ❑ Each paper should start with an introduction and end with a summary.
- ❑ Each section should start with a short introduction and end with a summary with a lead in to the next section. The same applies to subsections.
- ❑ All subsections should be of comparable length.
- ❑ Add an appendix with all abbreviations
- ❑ Add a list or discussion of related products

## Student Questions

# Writing Style

- ❑ Readers want to get to the information fast. Keep the nonessential stuff at the end.
- ❑ Check thoroughly for grammar and spelling.
- ❑ Avoid excessive use of abbreviations.
- ❑ Be consistent in case and usage: MOBILE, Mobile, mobile

## Student Questions

# Organization

- ❑ Every paper should have an introduction and a summary.
- ❑ Divide paper into sections.
- ❑ Every section should have a lead-in paragraph.
- ❑ Header level should correspond to the level in table of contents.

## Student Questions

# Organization (Cont)

- Title
- Author
- Abstract
- Keywords
- Table of Contents
- Introduction
- Other Sections
- Summary
- List of Acronyms
- References
- Date Last Modified:

## Student Questions

# Organization (Cont)

- ❑ Table of Contents
  - Sections and subsections
  - Numbering n.n
  - 3-7 subsections per section
  - 3-7 sections per paper
  - Include one first and 2nd level headers n. and n.n
  - Do not include 3rd and higher levels, e.g., n.n.n

## Student Questions

# Title/Keywords/Abstract

- ❑ Title
  - Based on Table of contents
  - Searchable
- ❑ Abstract
  - Based on Table of Contents
  - 3-7 sentences
  - Emphasize what part of course was used in the paper
- ❑ Key Search words
  - Based on Table of contents
  - Acronyms and full names
- ❑ Description:
  - One line based on ToC and Abstract

## Student Questions



# Organization (Cont)

- ❑ Introduction
  - Explain what the topic is about.

**Student Questions**

# Other Sections

- ❑ Each section less than 3 pages.
- ❑ Each section needs at least one introductory paragraph. Do not start with a subsection.
- ❑ Each subsection at least 1 paragraph.
- ❑ All sections/subsections should be numbered n. n.n
- ❑ If you borrowed several sentences from some source, italicize the text and indicate the source.

Never write a sentence with the original source in front of you. This will block you from writing it in your own words. Write ideas from source, merge ideas from different sources, and then write the ideas in your own words.

## Student Questions

## Other Sections (Cont)

- ❑ Always include citations for sources of ideas even if the expression is yours.
- ❑ Redraw the line drawings. Avoid copy and paste as much as possible (e.g., for photographs).
- ❑ If there is no author, e.g., a web page, use the site name followed by a number, e.g., [wikipedia02] in the body of the text, with full title and url in the reference list.
- ❑ If multiple papers in the same year from the same last name, use [lastnameyya] [lastnameeyyb],... in the text.

### Student Questions

# Summary

- ❑ One or more sentences about the each issue.
- ❑ Based on Table of Contents
- ❑ Key lessons

## Student Questions

# References

- ❑ Style of References
  - Author, “Title,” publisher, year, ISBN for books
  - “Title,” URL [One line description] for web pages
  - Author, “Title,” source, year, pp., URL for technical/magazine articles
- ❑ All authors: First-initial. Last-Name or First-Name Last-Name.  
Do not use Last-Name, First-Name or First-Initial.
- ❑ All URLs should show up as well as have a link.
  - This allows URLs to show in printed version.
- ❑ In the text point to the end  
In the end point to actual URL. Provide URL.

## Student Questions

# References (Cont)

- ❑ Find URL for published papers
- ❑ Do not include references that are useless.
- ❑ In the text, use [Authoryy] notation, e.g., [Jain99]  
Exceptions: Standards, company documents, RFCs.
- ❑ Shorten IEEEExplore URLs to include only *arnumber*, e.g.,  
<http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=4301304>
- ❑ All references should consistently use the same style

## Student Questions

# List of Acronyms

- ❑ Search the text
- ❑ Define on first use
- ❑ Avoid acronym use if used less than 5 times.
- ❑ Exception: Commonly used acronyms, e.g., CPU, I/O, IP, ...

## Student Questions

# Figures/Tables

- ❑ All figures should be numbered 1, 2, ...
- ❑ All tables should be numbered 1, 2, ...
- ❑ All figures should have a title below the figure
- ❑ All tables should have a title above the table
- ❑ All figures/tables should be referenced in the text and explained.
- ❑ Should be placed close to their references.
- ❑ To prepare figures in Windows use blank slides in PowerPoint using the font sizes to be used in the paper. Group the figure as one object. Copy and use paste special as “Enhanced Windows Metafile (EMF)” for best quality.
- ❑ Do not rescale figures in Word. Rescaling the fonts reduces their quality.
- ❑ All Figures and Tables should have a max width of 6.5” (to allow printing on a letter size paper)
- ❑ Use only .jpg, .png, .gif files for figures. No fig?.pdf

## Student Questions



# Draft Submission

- ❑ Submit 4 hardcopies
- ❑ In the draft:
  - For the review purposes, the author's name and email should be removed. Substitute last 3 digits of your student ID.
  - Add keywords after abstract
- ❑ Spell check using MS Word
- ❑ Grammar Check: <https://app.grammarly.com/>
- ❑ Plagiarism check: <http://www.scanmyessay.com>

## Student Questions

# Editorial

- ❑ Check all acronyms. All acronyms should be defined on first use.
- ❑ Check capitalization. No unnecessary capitalization. Headers are usually capitalized.
- ❑ Spell Check entire document.
- ❑ K=1024, k=1000. Disk storage is measured in KB, network link speeds are measured in kb. kbps not Kbps.
- ❑ Leave a space between numbers and units, e.g., 15 km not 15km.

## Student Questions

# Editorial (Cont)

- ❑ Look for special characters
- ❑ American English: Signaling, Synchronization
- ❑ Check for continuity
- ❑ Break long paragraphs.
- ❑ Single space between paragraphs.
- ❑ The paper should be 10-15 pages long
- ❑ If you copy any figures, give reference and credit
- ❑ Use the meta tags as discussed

## Student Questions

# Common Mistakes

- ❑ No Figures
- ❑ Figure/equations fonts too large
- ❑ Figures with no title or number or reference
- ❑ Figures/tables overflowing the margins
- ❑ References with no annotation
- ❑ References not cited
- ❑ Key pieces of information w/o references
- ❑ Tables w/o references
- ❑ Papers too short

## Student Questions

# Common Mistakes (Cont)

- ❑ No comparison of different alternatives
- ❑ No Acronyms
- ❑ No summary
- ❑ Incorrect reference style
- ❑ No keywords

## Student Questions

# HTML Guidelines (Cont)

- ❑ File name: index.html, fig1.gif, fig2.gif, ..., fig.ppt
- ❑ Keep PowerPoint figure source files in the same directory although these may not be referenced in the paper
- ❑ Keep all references relative.  
Absolute:  
`http://www.cse.wustl.edu/~jain/papers/comcom17.htm`  
Relative: `papers/comcom17.htm`  
or `comcom17.htm`
- ❑ Keep the whole paper in one file “index.html” with figures in `fign.gif` in the same directory. No Subdirectories.

## Student Questions

# HTML Guidelines (Cont)

- ❑ All filenames and extensions should be lowercase and contain no spaces. No .JPG
- ❑ Author (at) wustl.edu
- ❑ Ensure there is a link attached to every line in Table of contents
- ❑ Spread references throughout the document. Use mnemonic references with link attached to them, e.g., [Cisco99]
- ❑ Keep all internal anchor names and ids start with alphabet, lowercase without spaces, dot, or special characters, e.g., cisco99. No sec2.1
- ❑ Use only id (not name):  
ok: <A id="xx">  
Not ok: <A name="xx">
- ❑ All img should have alt, height, and width.
- ❑ Width and height should match the image size.

## Student Questions

# HTML Guidelines (Cont)

- ❑ Do not resize images in html. Resize them before using. Prepare figures so that there is no rescaling required. Use 12 point fonts in PowerPoint.
- ❑ Center all figures, tables, and equations
- ❑ Serially number all figures as 1, 2, ... not 1.1 2.1 etc.
- ❑ Serially number all tables as 1, 2, ...
- ❑ No font tags
- ❑ Check that keywords tags in the header are appropriate and exhaustive.
- ❑ Check that description in header is appropriate.

## Student Questions



# Check for Plagiarism

- ❑ Viper – The anti-plagiarism scanner  
<http://www.scanmyessay.com/>  
Requires Windows but best free checker

## Student Questions

# Final Submission

- ❑ Validate your page using trial version of CSEHTML validator downloaded from: <https://www.htmlvalidator.com/>
- ❑ I use CSE HTML Validator Pro
- ❑ Check URLs. Check local anchors.
- ❑ Remember to submit copies of unusual references (not available in the library or the Internet) with the final paper.

## Student Questions

# Final Submission (Cont)

- ❑ No WinWord generated HTML
- ❑ You can use WinWord for spell checking the text
- ❑ Use plain text editor to insert HTML tags..
- ❑ Submit the final HTML version as a single zip file
- ❑ No Tar/tgz files (please submit only one zip file with all files)
- ❑ Filename: 8-or-less-letters-short-project-name.zpi  
Rename zip file to .zpi for transmission through email.
- ❑ Email .zpi file to: [jain@cse.wustl.edu](mailto:jain@cse.wustl.edu) with the subject field of “CSE570 Project Report”

## Student Questions

# Common Mistakes in HTML

- ❑ Used WinWord generated HTML file.
- ❑ Used dots in IDs
- ❑ No height or width in img
- ❑ Did not validate HTML.
- ❑ Incorrect title.
- ❑ Images resized in HTML. Height and Width attribute in the images do not match those of the actual image.
- ❑ Used HTML4
- ❑ WUSTL proxy in URLs
- ❑ Figures not scaled properly
- ❑ Table rows not aligned on top

## Student Questions

# Checklist

T F

1.   Are Keywords appropriate?
2.   Is the title satisfactory?
3.   Does the abstract clearly summarize the topic discussed?
4.   Table of Contents logically organized?
5.   Does introduction entice you to read the rest of the paper?
6.   Major ideas and topics received enough attention?
7.   Are individual sections and subsections of uniform length?
8.   Are references correctly formatted and spread throughout?
9.   Include author, title, dates, pages, and URL?
10.   Did the author follow the diamond explanation principle?
11.   Acronyms used properly and listed?
12.   Figures and Tables (Clearly labeled and professional looking, referenced in the text and explained)
13.   Are paragraphs of right length (not too long or too short)?
14.   Do the subheadings clarify the sections of the text?
15.   Was the material ordered in a way that was logical, clear, and easy to follow?
16.   Is there any portion of the text that could be omitted?
17.   Does the summary point out the key results?
18.   Copyright violations in text, figures, or tables?
19.   Text checked for Grammar, Spelling, Punctuation errors
20.   Is the quality good enough for publication in IEEE Magazine?

## Student Questions

# Scan This to Download These Slides



Raj Jain

<http://rajjain.com>

[http://www.cse.wustl.edu/~jain/cse570-21/m\\_00prj.htm](http://www.cse.wustl.edu/~jain/cse570-21/m_00prj.htm)

## Student Questions

- ❑ Should our topic be about networking?

*Yes. I will circulate a list on Piazza.*

- ❑ In general, are we looking for a survey, experiment, or theory in project?

*Any one of the three.*

# Related Modules



CSE567M: Computer Systems Analysis (Spring 2013),

[https://www.youtube.com/playlist?list=PLjGG94etKypJEKjNAa1n\\_1X0bWWNyZcof](https://www.youtube.com/playlist?list=PLjGG94etKypJEKjNAa1n_1X0bWWNyZcof)

CSE473S: Introduction to Computer Networks (Fall 2011),

[https://www.youtube.com/playlist?list=PLjGG94etKypJWOSPMh8Azcg5e\\_10TiDw](https://www.youtube.com/playlist?list=PLjGG94etKypJWOSPMh8Azcg5e_10TiDw)



Wireless and Mobile Networking (Spring 2016),

[https://www.youtube.com/playlist?list=PLjGG94etKypKeb0nzyN9tSs\\_HCd5c4wXF](https://www.youtube.com/playlist?list=PLjGG94etKypKeb0nzyN9tSs_HCd5c4wXF)

CSE571S: Network Security (Fall 2011),

<https://www.youtube.com/playlist?list=PLjGG94etKypKvzfVtutHcPFJXumyyg93u>



Video Podcasts of Prof. Raj Jain's Lectures,

<https://www.youtube.com/user/ProfRajJain/playlists>

## Student Questions