Technical Writing Process

• **Recommended reading**
  Part Two of Book: Technical Communication.

• **Writing process**
  The writing of a project report may include the following major steps: defining the task, gathering evidence, organizing and outlining, writing the initial draft, revising, and preparing the final report.

• **Defining the task**
  The first step of writing a project report is to decide the purpose and readers of the report. To define the task for your writing, you may need to answer the following questions.

  - Why do you need to write this report?
    The answer is usually someone wants the report. Then you should figure out who wants the report and for what reasons. You should be clear about the background for the reasons to have a report.
    A report can be a writer-initiated one or reader-initiated one. A capstone project report can be considered as a writer-initiated document. The readers need the information obtained in your project but you, the writer, initiates the report to inform and persuade the readers to receive your results. A typical reader-initiated document may be a report to answer an inquiry from some readers.

  - Who will be the readers?
    The readers are the people who will encounter the report. To figure out the readers of your report, you need to know how many readers would be; the relationship between the author and readers; the readers’ responsibilities, interests, and attitudes; the information the readers want to get from the report; and the knowledge background of the readers.
    A capstone project report is a technical document which will be available to public. It should deliver the results obtained in a research/industry project to the people who are interested in the state of the art in the corresponding research/industry area. It can be assumed that the readers have fundamental knowledge on information technology (IT). It is usually that the readers interprete the report and the authors may response to the inquiries from readers.

  - How will the report be used?
    A capstone project report will be available to public. The report will be read by supervisors of the project and anyone who is interested in the new progresses in the related research/industry area.

  - How will the report be evaluated?
    The report will be evaluated by the instructors of CMPT497 based on the quality of the technical contents and the quality of the writing (the critiria for writing have been
explained in Note 1). The quality of technical contents will be evaluated mainly based on the importance and completeness of the work. Additional factors considered in the evaluation include the challenges, creativity, and innovations for the work. Good (informal) evaluations from readers other than the instructors will improve authors’ credits in their professions.

- What are the constraints for writing the report?
  There are time deadlines to complete the report. Roughly speaking, a detailed outline of the report should be completed in six weeks, the 1st draft of the report should be completed in nine weeks, and the final report should be completed in 12 weeks. The report must follow a specific format. The authors need to learn LaTeX to use the template for the report.

In defining the task, the following factors should also be considered. What resources are available? For the project report, there are instructors to provide guidance for the writing. What is the length of the report? In principle, there is no page limit, however, a good report should not have redundancy. What is the complexity of the report? You need to decide how much information you want to include in your report. How important is the report? A capstone project can be considered as a milestone in your career. It should be a most important achievement of yours in your undergraduate study. How long will the report be used? A good technical report may be appreciated for many years.

- Collecting information
  Before writing a report, the information to be included in the report should be decided. Further investigations and experiments may be needed to collect the required information. The degree of rigour for such investigations and experiments should be considered. For a scientific proof, the evidences should be collected in a most rigorous and precise way. For a business proof, the evidence may be collected in a less rigorous and precise way than that for a scientific proof. However, the investigations and experiments are expected to be as thoroughly as possible.

  The information to be included in a report should be analyzed and interpreted. It should be classified into the part owned by the author and the part owned by others. References for the part owned by others should be included.

  A comprehensive survey on the topic of the report is very important. This survey provides the information on the background and motivation of the project, the state of the art of the research in the related field, and the distinctions of the results of the project from the known ones. The introduction chapter or section of a report is usually based on the survey.

- Organizing and outlining
  Organizing is to work out a structure for the contents to be included in the report. This structure should partition the contents into a few main topics, each main topic may include a few subtopics and so on, to best present the contents to readers. Making an outline is an effective way for organizing. For a long formal report, a formal outline is very helpful for organizing. A formal outline for a project report usually includes the following.
Main topics, subtopics, and sub-subtopics.

The hierarchical structure for the topics

A formal outline should define the main divisions of the report and the subdivisions of each division. A main division covers one main topic and is usually called a chapter. The subtopics of a main topic are covered by subdivisions, usually called sections, in the Chapter. Each section may have subsections, each subsection may have sub-subsections, and so on. Each of chapters, sections, and subsections should be given a title (heading) which depicts the topic of the chapter, section, or subsection.

The sequence of chapters and sections

The outline should also define the sequence of the chapters in the report and the sequence of sections in each chapter.

To make an outline, one may start listing the topics to be included in the report. Next a hierarchy of the topics is decided. Then, the sequence of chapters and sections is determined. In making an outline, one may need to keep the following in mind. Does the outline consider the needs of the readers? Is the hierarchy designed logically? Are the titles of chapters and sections clear, accurate, and concise? Do the titles reflect the logic of the hierarchy? Are the sections in each chapter balanced? Do the topics cover all contents to be included in the report? Is there any redundancy in topics?

• The first draft

The first draft of a report is the first full version of the report. To get a full version of the report, one needs to write the contents of the report following the outline. In the writing, appropriate typography and indention should be used to show the hierarchy of topics.

Writing introductions, transitions, and summaries for topics is important and difficult. An introduction usually attracts most attention of a reader. It gives a good start of a topic or the report. A transition text bridges topics and guides readers from one topic to another. A summary ends a topic. It concludes and stresses the claims of the author on the topic.

Most of the work for the first draft may be the writings to convert the items in the outline into paragraphs. Paragraphs are used as both spatial units to make the text more readable and structure units to reflect the hierarchy structure of the text. One paragraph usually covers only one topic. It is normally to start a new paragraph for a new topic. Some transition words may be used to indicate the change of topics.

• Revising

Revising is a key step to improve the draft. In the revising process, one may first review whether the draft has met the requirements defined in the task and then do the specific revisions. It is important to review the draft from a reader’s point of view. This may be difficult. Once one gets less familiar with the draft, one may find more improvements.

In the specific revisions, the following aspects of a draft should be considered: content, organization, paragraph structure, sentence structure, graphics, word choice, and mechanics (spelling, etc.).
– Content
In the revision, it should be checked whether all information the readers need and only that has been included in the draft. One may need to add some information to, delete some information from, or/and modify some content of the draft. A well used approach is to include all details of the results in the first draft and then delete and/or simplify some of the details in the revision because deletion is easier to do than addition.

– Organization
Reviewing the structure of a draft is a key point of the revision. Sequence, titles, introductions, transitions, and summaries are important for the structure.

– Paragraph structure
The paragraph structure of a draft should reflect the structure of the topics. Each paragraph should usually have a topic sentence, a central idea, and supporting evidence. Each paragraph should have a good internal structure, the sentences for each part appear in a correct order in the paragraph and are connected cohesively. A paragraph should have an appropriate length.

– Sentence structure
The clarity, conciseness, and grammar of sentences should be checked.

– Word choice
A same concept may be expressed in different ways, resulting in different tones of the expressions. It should be checked if the tone by the words is appropriate for the readers. Whether an expression is precise enough or not should be checked. Technical terms are important for a project report. It should be checked whether each technical term can be understood by readers. A common problem in technical writing is to use technical terms without defining/explaining them. It may be difficult to decide which terms are common knowledges and thus can be used without defintion/explanation, while which should be defined/explained before use them. One approach for this problem is make an assumption on the knowledge level of the readers. For a capstone project, the readers may be assumed to have the fundamental knowledges on IT obtained in the first two years of a college/university.

– Mechanics
It should checked whetehr the spelling, capitalization, punctuation, use of numbers and units, and use of abbreviations are correct.

The revising process may consist of many passes, each pass may be a general revision covering all aspects or concentrate on a specific problem.

• Final version of the report
The final version of a report is the document submitted for evaluation and/or distribution. There is usually a deadline for the submission. There is usually a format requirement for the report. It is important to design a good layout within the required format for the report. A final proof reading before the submission is very important and this is the last chance to find any mistakes.