13 Paragraphs

How to combine sentences? How to begin paragraphs? How to link paragraphs to each other? Introductory paragraphs (at the beginning of a chapter)

13.1 Combining sentences in a paragraph

1. Use (but do not overuse!) conjunctions or transitional words:

   - Time links, when you describe a process: then, next, first-second-third, while, ...

   - Cause-effect links, when you describe reasons or results: therefore, as a result, thus, ...

   - Addition links, when you add points: in addition, moreover, similarly, ...

   - Contrast links, when you describe two sides of one thing: however, despite (=inspite of sg), ...

   - Other: For example,...

2. Link the beginning of a sentence to the end of the previous sentence. E.g. the subject of sentence 2 is the object of sentence 1.
   "A model consists of a model structure and model parameters. The model structure defines..."

3. Repeat the key terms througout the paragraph. However, do not repeat the same word twice in one sentence.

Task: Seach useful expressions from the text extract given to you!

13.2 Dividing a section into paragraphs

13.2.1 Logical structure

> Logically structured disposition (topic outline) is the most important thing in writing!

Analogy: In software engineering, the earliest errors (in specification and design phases) are the most expensive, if they are not recognized in the beginning. If you don't plan, you write awful spaghette code which nobody

understands or can debug. Similarly, writing an illogical or a poorly organized disposition can cause serious problems. In the worst case, you have to write everything again!

$\rightarrow$ Spend time and write the disposition carefully!

An iterative process:

1. The main structure of the whole thesis: the main chapters and their contents in a couple of sentences or key words. The order of chapters.

2. For each chapter (or an article), the main sections + key words, introductory sentences or phrases. The order of sections.

3. In each section, the subsections or paragraphs. The introductory sentences, key words, and the order of paragraphs. List the related tables and figures.

Mark the points you wish to emphasize!

Suggestion: put your disposition on one side for a while, before you begin writing.

13.2.2 A paragraph

The topic for each paragraph must be clearly stated – usually in the first sentence = **topic sentence**.

- Helps the reader: tells what the paragraph is about.

- Helps the writer: forces you to organize the material logically.

- In an ideal case, you get a summary of the whole section by reading the topic sentences.

- If you cannot write a clear topic sentence, ask yourself whether the paragraph is needed at all!

Other good advice:

- Never begin with unimportant words. The beginning of a paragraph is the most important.

- Omit superfluous phrases like
  "First let us consider..."
  "An interesting example which must be mentioned in this context is..."
  "Next it must be noted that..."

- Emphasize important things by

  – telling them in the beginning of a paragraph or beginning of a sentence,

  – expressing them in short sentences,

  – repeating the key words, or

  – numbering.

- Keep the same verb tense (change it only for good reasons).

- Express parallel things in parallel structures.

If it is hard to divide a section into paragraph, list the things in a bullet list. Arrange the items and give them mini-subheadings. All items under one such heading belong to one paragraph. Tell the topic (expressed in the heading) in the topic sentence.

13.3 Introductory paragraphs

In the beginning of each chapter or a section having subsections, give 1-2 introductory paragraphs. These paragraphs tell what the chapter or section is about, i.e. it introduces the topics of sections or subsections. In the beginning of a chapter you can also introduce the main theme or problem and motivate the reader.

Suggestion: just one brief paragraph in the beginning of a section, a longer or a couple of paragraphs in the beginning of a chapter.

E.g. for the section "Correlation analysis":

"In the following, we recall the most common measure for correlation, Pearson correlation coefficient. We discuss restrictions and extensions of the common correlation analysis. Finally, we analyze the *ViSCoS* data by Pearson correlation and correlation ratios to reveal linear and non-linear dependencies."

In the beginning of chapter "Modelling dependencies between attributes" (could be briefer):

"The main goal of predictive modelling is to predict a target variable Y from a set of other variables $X = \{X_1, ..., X_k\} \subseteq R$. Variables X are called *explanarory*, because they explain Y. The existence of such model requires that Y depends on X. Thus, the first step of modelling process is the descriptive analysis of dependencies between Y and X. The task is two-fold: First, we should select an attribute set X which best explains Y. Then we should analyze the type of dependency. Given this information, we can select the appropriate predictive modelling paradigm and define restrictions for the model structure.

In the following, we define the main types of dependencies for categorial and numeric data. We introduce three techniques (correlation analysis, correlation ratios, and multiple linear regression) for modelling dependencies in numeric data and four techniques (χ^2 independence test, mutual information, association rules, and Bayesian networks) for categorial data. In both cases we begin by analyzing pair-wise dependencies between two attributes, before we analyze dependencies between multiple attributes $X_1, ..., X_k$ and the target attribute Y. This approach has two benefits. First, we can avoid testing all 2^k dependencies between subsets of $\{X_1, ..., X_k\}$ and Y, if Y turns out to be independent from some X_i. Second, this analysis can reveal important information about suitable model structures. For example, in some modelling paradigms, like multiple linear regression and naive Bayes model, the explanatory variables should be independent from each other. Finally, we analyze the suitability of described modelling techniques for educational domain."

14 Punctuation

Goal: to make the text clearer. Unfortunately, the English punctuation rules (especially the use of comma) do not always coincide with the rules of your mother tongue.

Usually you manage with just two marks: **full-stop** and **comma**! The basic rules for other marks are:

- Use colon ':' only when needed.

- Avoid semicolon ';' and dash '–'.

- Avoid unnecessary parantheses '('...')'.

14.1 Full-stop

Full-stop ends a full sentence. Do not use comma instead of full-stop to separate independent clauses which are not logically related.

14.2 Comma

14.2.1 Comma is used

1. To separate introductory phrases and conjunctions (however, thus, similarly, etc.):
   "Ideally, all references are entered into a bitex database."
   "Theorem 1 is important for two reasons. First, it allows us to... Second, it ..."
   "Despite the high time complexity, X is often used..."
   "For example, we can search episodes in www log data..."

2. When the sentence begins with a dependent clause.
   "Since $\overline{x}$ is a statistic, it is also a random variable."
   "If this condition is not satisfied, then the confidence bounds cannot be used."

3. When a non-restrcitive relative clause is embedded into an independent clause or ends a sentence.
   "X, which is responsible for data preprocessing, initializes Y."

4. When two phrases with the same meaning are used side by side.
   "One of the most useful statistics is $\overline{x}$, the sample mean."

5. When the sentence begins by an infinitive structure (a clause substitute).
   "To find the lower bound for the confidence interval, we isolate..."

6. To separate items in a list of three or more items. An "Oxford comma" = the last comma before **and**, **or**, or **nor**. "X is simple, fast**,** and easy to implement"

7. To avoid ambiguity.
   "Instead of hundreds, thousands rows of data is required"
   "Instead of 20, 50 students participated..."
   "What the actual reason is, is not fully understood"
   (better: "The actual reason is not fully understood")

14.2.2   No comma is used

1. When an independent clause is followed by a restrictive relative clause or is embedded with a restrictive rel. clause (especially before **that**). Exception: "It must be remembered, however, that..."

2. Between two independent clauses (in British English).

3. Before an indirect question.

4. When you begin by a prepositional phrase expressing the place. "In this section we discuss..." "In Chapter 3 we defined..."

14.3   Colon

Use colon between a grammatically complete introductory clause and a final phrase or clause that illustrates or extends it. If the following clause is a complete sentence, it begins with a capital letter.

"The formal definition of X is the following: (definition here)"
"X has several benefits: It is efficient, robust, and easy to implement."

14.4   Dash

Dash is nearly always used in pairs. You can always use commas instead of dashes. Additional details can also be separated by parantheses. Notice that dash interrupts the contuinity of a sentence!

Advice: Do not use dash, if you are not sure how to use it!

"The two students – one cs student and one maths student – were tested separately."

14.5   Semicolon

Semicolon separates two independent clauses. It is stronger than a comma but weaker than a full-stop. You can always replace it by a full-stop, and sometimes by a comma structure.

Advice: Save semicolons to program code!

Suits to separate independent clauses in a list:

"Metric d has three properties:

1. d is reflexive, i.e. $d(x, x) = 0$ for all x;

2. d is symmetric, i.e. $d(x, y) = d(y, x)$ for all x, y;

3. Triangular inequality holds for d, i.e. $d(x, z) \leq d(x, y) + d(y, z)$.

or to separate elements in a series which already contains commas:
"The colour order was red, yellow, blue; yellow, red, blue; or blue, yellor, red."

14.6   Quotation marks

Quotation marks are necessary when you represent a direct citation!

You can use them also when you introduce a word or phrase used as an ironic comment, as slang, or as an invented expression. Use the quotation marks only when the new term is mentioned for the first time!

"Researchers have developed several measures to evaluate the "interestingness" of an association rule."

Notice: when you use a word or letter as an linguistic example, you can use a special font, e.g. italicize it (just be systematic with the font you select).
"According to algorithm X, words *cat* and *God* were similar."

Similarly, when you mention variable names, values etc. use a special font (unless they mathematical symbols → \$ characters (math mode). E.g. "X can have three values `low, medium, high`." "`Action1` is selected with the probability of 0.6 and `Action2` with the probability of 0.4."
In latex

```
{\tt Action}
```

14.7   Parantheses

Parantheses are used for two purposes:

- To introduce an abbreviation
  "*Minimum description length* (*MDL*) principle is often used to..."

- To add extra details. **Advice**: do not overuse them!
  "Two common choices are to represent a cluster by its centroid (central point) or by its boundary points."
  "In *minimum edit distance* we define the minimum number of operations (e.g. insertion, deletion, substitution) needed to transform one string to another."

Sometimes you can give extra references (extra reading) in paranthesis:

"To restrict the future development of adaptive learning environments as little as possible, we have adopted a wide (and visionary) view of *context-aware computing* (*ubiquitous computing* (see e.g. [**?**, **?**]), in which the whole context – the user, her/his actual situation and all relevant information – is used for determining the most appropriate action."

15 Prepositions

- Be careful with prepositions. A wrong preposition can give a totally different meaning!

- Hint: When you use a preposition, visualize the direction it is signalling and ask yourself if it is appropriate.

- If you are unsure about the use of a preposition, ask yourself what a cat would do! (Fedor's sciwri book)

  Cats sit **on** mats, go **into** rooms, are part **of** the family, roam **among** the flowers.

15.1 Expressing location

- Usually **in**, e.g. "in set X"

- If an exact location, then **at**, e.g. "at point (x, y)"

- If the location can be imagined as a line or a surface, then **on** "on the x-axis", "on a time line"

Notice: "**on** page 3", "**on** line 5"

"A file is loaded **from** the hard disk **into** main memory."
"results **from** the survey suggest..."
over – under/beneath
above – below

"X's points were **below** the average points"
"The task is to optimize f **under** the given constraints"

15.2 Expressing time

- Exact time: **at**, e.g. "at the moment", "at four o'clock", "at the same time"

- Longer period of time: **in**, e.g. "in the 1970's", "in the future", "in five minutes", "events occur close in time"

Notice: "In the beginning/end" vs. "At the beginning/end of sg"

15.3   Expressing the target or the receiver: to or for?

Basic rules:

- When direct receiver, then **to**
  "The values are assigned to variables"

- When the final receiver (for whom sg is meant) then **for**
  "I gave the book for Belinda to Tersia"
  "The messages for nodes F and G are transfered to node D for rerouting"

- When sg is good or bad for sg, then **for**
  "Problem-based learning is good for students"

Some verbs require either for or to:

1. If the verb is {bring, give, take, show, offer} $\rightarrow$ **to**

2. If the verb is {be, get, keep, make} $\rightarrow$ **for**

Sometimes the preposition can be missing, depending on the word order:

> i) verb + receiver + object
> ii) verb + object + to/for + receiver
> iii) verb + to/for + receiver (no object)

- If the verb is **tell**, then always case i.

- If either object or receiver is pronoun, then the pronoun becomes before the noun (case i or ii)

- If both are pronouns, then the object becomes first (case ii)

- If the verb is {belong, describe, explain, introduce, reply, say, speak, suggest} $\rightarrow$ always **to** (cases i–iii)

Task: Draw a decision tree for deciding when to use "to" or "for"!

15.4 Special phrases

Some prepositional phrases just have to be remembered! (or checked)

constraint **on** sg (e.g. contraints on the order)
independent **from** sg but dependent **on** sg
different **from** sg but similar **to** sg
difference **between** sg and sg
prefer sg **to** sg
impact of sg **on** sg
influence **on** sg
effect **on** sg (but to affect sg)
a discussion **about/on** sg (but to discuss sg)
research **on** sg but a study **of** sg
reason **for** sg
opportunity **of/for** sg
in spite of sg (but despite sg)
take into account
in relation to sg
a proportion **of** sg. ("a large proportion of data")
in proportion **to** sg, proportional **to** sg ("The time complexity of f proportional to n is...")
the ratio **of** a **to** $b = a/b$
$x\%$ **of** y
by default

16   Genitive: 's or of?

> Default: For animate things (people and animals) **'s**: **possessor's possessed** (in plural **possessors' possessed**).
> For inanimate things **of** structure: **the possessed of possessor**.

Nowadays, **'s** genitive can be used also for inanimate things, especially in certain special cases (especially in American English!). However, never use **'s** genitive for abstract things!

"The meaning of life", "The time complexity of algorithm X".

16.1   Special cases where 's genitive is used for unanimate things

1. Temporal expressions: "two weeks' holiday", "an hour's work". However, in some expressions only **of** is possible: "in the middle of August".

2. Sometimes when the noun is geographical (country or city): "London's sights". However, if the target expresses place (town, city, kingdom, island), then **of**: "The city of Joensuu"

3. When the noun expresses place and is followed by superlative: "The world's best computer games".

4. When possessor is a collective noun, **'s** is often used, but **of** is also possible: "The board's decision".

5. When you express part–whole relation, **'s** is often used, especially in body parts "the car's doors", "the cat's whiskers".
   Hint: If the possessed necessarily belongs to the possessor → **'s**, if the possessed can exist alone → **of**.

6. Some special phrases: "For goodness' sake".

16.2   When of structure is necessary

's genitive makes the possessed noun definite, i.e. **possessor's possessed = the possessed of possessor**.
→ definite article **the** in the **of** genitive.
If you want to express that the possessed is indefinite (one of many), **of** genitive is the only choice (even if you refer to people): "a son of the mayor".

16.3 Possessive form of pronouns

When the possessor is a pronoun, use the possessive pronouns!

{my, your, her/his, its, our, your, their} + possessed.

If the possessive pronoun is not followed by noun, then special forms {mine, your, hers/his, ours, yours, theirs}. Seldom needed in scientific writing! (In spoken language e.g. "Whose cat is this? It is mine.")

In some special cases (rarely) you can use structure "of it" (referring to unanimate things) to emphasize the possessed. "I don't remember the name of it."