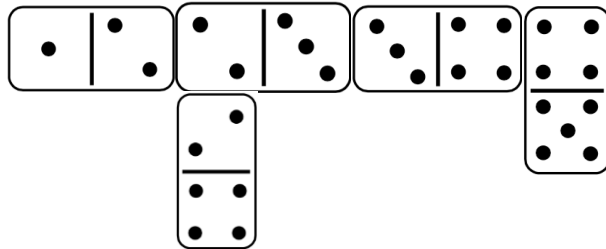




## The Given-New Principle



ELEC-L0901, March 7, 2017

Jan-Mikael Rybicki  
Language Centre  
[jan-mikael.rybicki@aalto.fi](mailto:jan-mikael.rybicki@aalto.fi)

- Our knowledge and information about world accumulates over time



## Parts of speech

Task 1. Underline the words representing each of the following grammatical classes.

- Noun** → The Aalto-1 nanosatellite was gradually built in a student project in broad cooperation with other Finnish universities and institutes.
- Verb** → The Aalto-1 nanosatellite was gradually built in a student project in broad cooperation with other Finnish universities and institutes.
- Adjective** → The Aalto-1 nanosatellite was gradually built in a student project in broad cooperation with other Finnish universities and institutes.
- Adverb** → The Aalto-1 nanosatellite was gradually built in a student project in broad cooperation with other Finnish universities and institutes.
- Preposition** → The Aalto-1 nanosatellite was gradually built in a student project in broad cooperation with other Finnish universities and institutes.

### KEY

- Noun** → The **Aalto-1 nanosatellite** was gradually built in **a student project** in broad **cooperation** with **other** Finnish **universities** and **institutes**.
- Verb** → The Aalto-1 nanosatellite **was** gradually **built** in a student project in broad cooperation with other Finnish universities and institutes.
- Adjective** → The Aalto-1 nanosatellite was gradually built in a student project in **broad** cooperation with other **Finnish** universities and institutes.  
(Other examples: *efficient, expensive, wide*)
- Adverb** → The Aalto-1 nanosatellite was **gradually** built in a student project in broad cooperation with other Finnish universities and institutes.  
(Other examples: *also, remotely, rapidly, widely*)
- Preposition** → The Aalto-1 nanosatellite was gradually built **in** a student project **in** broad cooperation **with** other Finnish universities and institutes.  
(Other examples: *to, of, for, at*)

Which of these **units of information** is the most important?

**Noun** (*substantiivi*)

**Countable** → **Tables** usually have four **legs**.

**Non-countable** → **Water** can be murky.

**Pronoun** → **We** have a great plan

"Head nouns"  
are underlined

**Noun Phrase** (*noun-plus-modifier combination*)

A high **correlation** was observed between data points.

The growing **demand** for asphalt is surprising.

The EU has established strict **limitations** on the size of plates that can be handled.

What is **the optimal order** for NPs?

How to make your text **reader-friendly**?

Three key principles:

1. Put **Given** before **New** Information
2. Put **"Topical"** Information in **Subject** Position
3. Put **"Light"** Before **"Heavy"** NPs

## Information in a sentence

Begin sentences with information that is **familiar (given)** to your reader.

Place any **new information** about the topic at the end of a sentence.

Given

New

### Subject

### Verb

### Object / Adverb

Finland

is located

in the northern Europe but is not a part of Scandinavia.

Finland

is classified as

a Nordic country.

A water molecule

consists of

two hydrogen and one oxygen atoms.

The speed of light ( $c$ )

equals to

299 792 458 metres per second in a vacuum.

## Task 2. Circle the main verb and underline the subject in the following text.

<sup>1</sup> An antenna is an electrical device which converts electric power into radio waves, and vice versa. <sup>2</sup> It is usually used with a radio transmitter or radio receiver. <sup>3</sup> In transmission, a radio transmitter supplies an electric current oscillating at radio frequency (i.e., a high frequency alternating current (AC)) to the antenna's terminals, and the antenna radiates the energy from the current as electromagnetic waves (radio waves). <sup>4</sup> In reception, an antenna intercepts some of the power of an electromagnetic wave in order to produce a tiny voltage at its terminals, which is applied to a receiver to be amplified.

Adapted from [https://en.wikipedia.org/wiki/Antenna\\_\(radio\)](https://en.wikipedia.org/wiki/Antenna_(radio))

## Task 2. Circle the main verb and underline the subject in the following text.

<sup>1</sup> An antenna is an electrical device which converts electric power into radio waves, and vice versa. <sup>2</sup> It is usually used with a radio transmitter or radio receiver. <sup>3</sup> In transmission, a radio transmitter supplies an electric current oscillating at radio frequency (i.e., a high frequency alternating current (AC)) to the antenna's terminals, and the antenna radiates the energy from the current as electromagnetic waves (radio waves). <sup>4</sup> In reception, an antenna intercepts some of the power of an electromagnetic wave in order to produce a tiny voltage at its terminals, which is applied to a receiver to be amplified.

The new information is at end of each sentence (after the verb.)

Adapted from [https://en.wikipedia.org/wiki/Antenna\\_\(radio\)](https://en.wikipedia.org/wiki/Antenna_(radio))

## Readability principles

### What is GIVEN Info?

- Concepts or objects that have already been **discussed** or are **presumed** to be **understood** from the **context**.

### What is NEW Info?

- Concepts or objects that have **not** already been **discussed** or presumed to be **known** from the **context**.

## Topical progression

Three patterns for linking **Given** information

1. **Constant Topic**
2. **Step-wise Topic**
3. **Hypertopic**

### 1. Constant topic

FAMILIAR → NEW

**1. Constant topic** (*Every sentence begins with a **familiar** main topic*)

Omnidirectional antennas receive ...



Omnidirectional antennas are employed ...



They are also used at ...

Omnidirectional antennas receive or radiate more or less in all directions. **Omnidirectional antennas** are employed when the relative position of the other station is unknown or arbitrary. **They** are also used at lower frequencies where a directional antenna would be too large, or simply to cut costs in applications which do not require a directional antenna.

## 2. Step-wise topic

FAMILIAR → NEW

**2. Step-wise topic** (*New info is presented at the end of sentence and is considered as familiar in the next*)

the **gain of the antenna**.

→ This **gain** can be accomplished ...

leading to **numerous antenna designs**.

→ **antenna designs** are fed ...

with **additional components** ...

→ Such **components** include

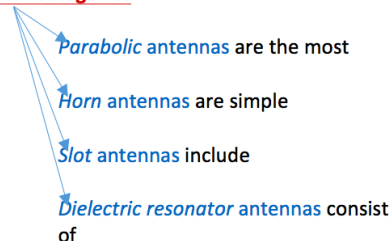
Antennas that are more complex than the dipole or vertical designs are usually intended to increase the directivity and consequently **the gain of the antenna**. **This gain** can be accomplished in many different ways leading to **numerous antenna designs**. **A vast majority of antenna designs** are fed with a balanced line (unlike a monopole antenna) and are based on the dipole antenna with **additional components** (or elements) which increase its directionality. **Such components** include ...

## 3. Hypertopic

FAMILIAR → NEW

**3. Hypertopic** (*A topic sentence introduces a set of subtopics*)

Aperture antennas can be divided into **four main categories**.



Aperture antennas are the main type of directional antennas used at microwave frequencies and above. **Aperture antennas** can be divided into **four main categories**. **Parabolic antennas** are the most widely used high-gain antenna type in radar antennas, satellite communication, and radio telescopes. **Horn antennas** are simple antennas with moderate gains of 15 to 25 dBi commonly used for applications such as radar guns, radiometers, and as feed antennas for parabolic dishes. **Slot antennas** include a waveguide with one or more slots cut in it to emit the microwaves. They are used as UHF broadcast antennas and marine radar antennas. **Dielectric resonator antennas** consist of small ball or puck-shaped piece of dielectric material excited by aperture in waveguide. They are used at millimeter wave frequencies.

Examples adapted from "Antenna (radio)". Wikipedia: [https://en.wikipedia.org/wiki/Antenna\\_\(radio\)](https://en.wikipedia.org/wiki/Antenna_(radio))

## Example text

Chang, M.-H., Das, D., Varde, P., and Pecht, M. (2012). *Light emitting diodes reliability review*. *Microelectronics Reliability*, 52(5):762–782. Available at <http://dx.doi.org/10.1016/j.microrel.2011.07.063>.

Chang et al (2012). *Light emitting diodes reliability review*.

## **TEXT PART 1**



- (1) Does the author maintain given-new principle?  
 (2) If yes, which patterns of topical progression are used?

Tip: Underline subjects and circle the main verbs.

### 1. Introduction

Light emitting diodes (LEDs) are a solid-state lighting source increasingly being used in display backlighting, communications, medical services, signage, and general illumination [1–6]. LEDs offer design flexibility, from zero-dimensional lighting (dot-scale lighting) to three-dimensional lighting (color dimming using combinations of colors), with one-dimensional lighting (line-scale lighting) and two-dimensional lighting (local dimming, i.e., area-scale lighting) in between. LEDs have small exterior outline dimensions, often less than 10 mm × 10 mm. LEDs, when designed properly, offer high energy efficiency that results in lower power consumption (energy savings) with low voltage (generally less than 4 volts) and low current operation (usually less than 700 mA). LEDs can have longer life—up to 50,000 h—with better thermal management than conventional lighting sources (e.g., fluorescent lamps and incandescent lamps). LEDs provide high performance, such as ultra-high-speed response time (microsecond-level on-off switching), a wider range of controllable color temperatures (4500 K–12,000 K), a wider operating temperature range (–20 °C to 85 °C), and no low-temperature startup problems.

Text 1

- (1) Does the author maintain given-new principle?  
 (2) If yes, which patterns of topical progression are used?

Tip: Underline subjects and circle the main verbs.

### 1. Introduction

Light emitting diodes (LEDs) are a solid-state lighting source increasingly being used in display backlighting, communications, medical services, signage, and general illumination [1–6]. LEDs offer design flexibility, from zero-dimensional lighting (dot-scale lighting) to three-dimensional lighting (color dimming using combinations of colors), with one-dimensional lighting (line-scale lighting) and two-dimensional lighting (local dimming, i.e., area-scale lighting) in between. LEDs have small exterior outline dimensions, often less than 10 mm × 10 mm. LEDs when designed properly, offer high energy efficiency that results in lower power consumption (energy savings) with low voltage (generally less than 4 volts) and low current operation (usually less than 700 mA). LEDs can have longer life—up to 50,000 h—with better thermal management than conventional lighting sources (e.g., fluorescent lamps and incandescent lamps). LEDs provide high performance, such as ultra-high-speed response time (microsecond-level on-off switching), a wider range of controllable color temperatures (4500 K–12,000 K), a wider operating temperature range (–20 °C to 85 °C), and no low-temperature startup problems.

Yes

**Constant topic : LEDs (given)**  
 - Each sentence provides new information on LEDs.

Given info / subject

Text 1

What is the reason for the following commas?

Light emitting diodes (LEDs) are a solid-state lighting source increasingly being used in display backlighting, communications, medical services, signage, and general illumination [1–6]. LEDs offer design flexibility, from zero-dimensional lighting (dot-scale lighting) to three-dimensional lighting (color dimming using combinations of colors), with one-dimensional lighting (line-scale lighting) and two-dimensional lighting (local dimming, i.e., area-scale lighting) in between. LEDs have small exterior outline dimensions, often less than 10 mm × 10 mm. LEDs, when designed properly, offer high energy efficiency that results in lower power consumption (energy savings) with low voltage (generally less than 4 volts) and low current operation (usually less than 700 mA). LEDs can have longer life—up to 50,000 h—with better thermal management than conventional lighting sources (e.g., fluorescent lamps and incandescent lamps). LEDs provide high performance, such as ultra-high-speed response time (microsecond-level on–off switching), a wider range of controllable color temperatures (4500 K–12,000 K), a wider operating temperature range (–20 °C to 85 °C), and no low-temperature startup problems.

**Text 1**

What is the reason for the following commas?

- To signal parenthetical (non-essential) information within a sentence, such as additional information, examples and re-naming something
- Parenthesis (and dashes - ) are used for a similar purpose

Light emitting diodes (LEDs) are a solid-state lighting source increasingly being used in display backlighting, communications, medical services, signage, and general illumination [1–6]. LEDs offer design flexibility, from zero-dimensional lighting (dot-scale lighting) to three-dimensional lighting (color dimming using combinations of colors), with one-dimensional lighting (line-scale lighting) and two-dimensional lighting (local dimming, i.e., area-scale lighting) in between. LEDs have small exterior outline dimensions, often less than 10 mm × 10 mm. LEDs, when designed properly, offer high energy efficiency that results in lower power consumption (energy savings) with low voltage (generally less than 4 volts) and low current operation (usually less than 700 mA). LEDs can have longer life—up to 50,000 h—with better thermal management than conventional lighting sources (e.g., fluorescent lamps and incandescent lamps). LEDs provide high performance, such as ultra-high-speed response time (microsecond-level on–off switching), a wider range of controllable color temperatures (4500 K–12,000 K), a wider operating temperature range (–20 °C to 85 °C), and no low-temperature startup problems.

**Text 1**

## Information on commas

Academic Writing in English (AWE) website  
<http://sana.aalto.fi/awe/punctuation/commas/index.html>

Chang et al (2012). *Light emitting diodes reliability review*.

## **TEXT PART 2**

- (1) Does the author maintain given-new principle?
- (2) If yes, which patterns of topical progression are used?

Tip: Underline subjects and circle the main verbs.

LED application areas include LCD backlights, displays, transportation equipment lighting, and general lighting (see Table 1). LEDs are used as a light source for LCD backlights in products such as mobile phones, cameras, portable media players, notebooks, monitors, and TVs. Display applications include LED electronic scoreboards, outdoor billboards, and signage lighting, such as LED strips and lighting bars. Examples of transportation equipment lighting areas are passenger vehicle and train lighting (e.g., meter backlights, tail and brake lights) [9], and ship and airplane lighting (e.g., flight error lighting and searchlights). General lighting applications are divided into indoor lighting (e.g., LED lighting bulbs, desk lighting, and surface lighting) [10,11], outdoor lighting (e.g., decorative lighting, street/bridge lighting, and stadium lighting), and special lighting (e.g., elevator lighting and appliance lighting) [12,13]. The use of LEDs in general lighting has increased, beginning with street lighting in public areas and moving onto commercial/business lighting and consumer applications.

Text 2

- (1) Does the author maintain given-new principle?
- (2) If yes, which patterns of topical progression are used?

Tip: Underline subjects and circle the main verbs.

Yes

**Hypertopic pattern:**  
LED application areas

**Better:** LCD backlights use LEDs as a light source

LED application areas include LCD backlights, displays, transportation equipment lighting, and general lighting (see Table 1). LEDs are used as a light source for LCD backlights in products such as mobile phones, cameras, portable media players, notebooks, monitors, and TVs. Display applications include LED electronic scoreboards, outdoor billboards, and signage lighting, such as LED strips and lighting bars. Examples of transportation equipment lighting areas are passenger vehicle and train lighting (e.g., meter backlights, tail and brake lights) [9], and ship and airplane lighting (e.g., flight error lighting and searchlights). General lighting applications are divided into indoor lighting (e.g., LED lighting bulbs, desk lighting, and surface lighting) [10,11], outdoor lighting (e.g., decorative lighting, street/bridge lighting, and stadium lighting), and special lighting (e.g., elevator lighting and appliance lighting) [12,13]. The use of LEDs in general lighting has increased, beginning with street lighting in public areas and moving onto commercial/business lighting and consumer applications.

Hyper-topic sentence with four subtopics

Text 2

- (1) Does the author maintain given-new principle?  
 (2) If yes, which patterns of topical progression are used?  
 Tip: Underline subjects and circle the main verbs.

Yes

**Hypertopic pattern:**  
**LED application areas**

**Better:** LCD backlights use LEDs as a light source

LED application areas include LCD backlights, displays, transportation equipment lighting, and general lighting (see Table 1). LEDs are used as a light source for LCD backlights in products such as mobile phones, cameras, portable media players, notebooks, monitors, and TVs. Display applications include LED electronic scoreboards, outdoor billboards, and signage lighting, such as LED strips and lighting bars. Examples of transportation equipment lighting areas are passenger vehicle and train lighting (e.g., meter backlights, tail and brake lights) [9], and ship and airplane lighting (e.g., flight error lighting and searchlights). General lighting applications are divided into indoor lighting (e.g., LED lighting bulbs, desk lighting, and surface lighting) [10,11], outdoor lighting (e.g., decorative lighting, street/bridge lighting, and stadium lighting), and special lighting (e.g., elevator lighting and appliance lighting) [12,13]. The use of LEDs in general lighting has increased, beginning with street lighting in public areas and moving onto commercial/business lighting and consumer applications.

Hyper-topic sentence  
 with subtopics

Text 2

**Hypertopic: LED application areas**

- Notice how subtopics appear in the paragraph in the **exact same order** as in the topic sentence.
- Notice also the repeated keywords (i.e., subtopics)



Hyper-topic sentence  
 with subtopics

**LED application areas** include (1) LCD backlights, (2) displays, (3) transportation equipment lighting, and (4) general lighting (see Table 1).

- 1) LEDs are used as a light source for **LCD backlights** ...  
*Better:* **LCD backlights** use LEDs as a light source ...
- 2) **Display** applications ...
- 3) Examples of **transportation equipment lighting** areas ...
- 4) **General lighting** applications ...

Text 2

Chang et al (2012). *Light emitting diodes reliability review*.

## TEXT PART 3

- (1) Does the author maintain given-new principle?  
(2) If yes, which patterns of topical progression are used?  
Tip: Underline subjects and circle the main verbs.

The color temperature of a white light is defined as the temperature of an ideal Planckian black-body radiator that radiates light of comparable hue to that white light source. The color temperature of light is equal to the surface temperature of an ideal black-body radiator in Kelvin heated by thermal radiation. When the black body radiator is heated to high temperatures, the heated black body emits colors starting at red and progressing through orange, yellow, white, and finally to bluish white. The Planckian locus starts out in the red, then moves through the orange and yellow, and finally enters the white region. The color temperature of a light source is regarded as the temperature of a Planckian black-body radiator that has the same chromaticity coordinates. As the temperature of the black body increases, the chromaticity location moves from the red wavelength range toward the center of the diagram in Fig. 2.

Text 3

- (1) Does the author maintain given-new principle?  
 (2) If yes, which patterns of topical progression are used?

Tip: Underline subjects and circle the main verbs.


The color temperature of a white light is defined as the temperature of an ideal Planckian black-body radiator that radiates light of comparable hue to that white light source. The color temperature of light is equal to the surface temperature of an ideal black-body radiator in Kelvin heated by thermal radiation. When the black body radiator is heated to high temperatures, the heated black body emits colors starting at red and progressing through orange, yellow, white, and finally to bluish white. The Planckian locus starts out in the red, then moves through the orange and yellow, and finally enters the white region. The color temperature of a light source is regarded as the temperature of a Planckian black-body radiator that has the same chromaticity coordinates. As the temperature of the black body increases, the chromaticity location moves from the red wavelength range toward the center of the diagram in Fig. 2.

Text 3

- (1) Does the author maintain given-new principle?  
 (2) If yes, which patterns of topical progression are used?

Tip: Underline subjects and circle the main verbs.

The color temperature of a white light is defined as the temperature of an ideal Planckian black-body radiator that radiates light of comparable hue to that white light source. The color temperature of light is equal to the surface temperature of an ideal black-body radiator in Kelvin heated by thermal radiation. When the black body radiator is heated to high temperatures, the heated black body emits colors starting at red and progressing through orange, yellow, white, and finally to bluish white. The Planckian locus starts out in the red, then moves through the orange and yellow, and finally enters the white region. The color temperature of a light source is regarded as the temperature of a Planckian black-body radiator that has the same chromaticity coordinates. As the temperature of the black body increases, the chromaticity location moves from the red wavelength range toward the center of the diagram in Fig. 2.



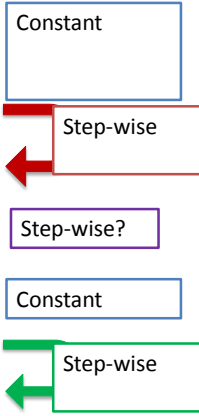
Text 3



- (1) Does the author maintain given-new principle?  
 (2) If yes, which patterns of topical progression are used?  
 Tip: Underline subjects and circle the main verbs.

Yes  
**Mix of constant and step-wise patterns**

The color temperature of a white light is defined as the temperature of an ideal Planckian black-body radiator that radiates light of comparable hue to that white light source. The color temperature of light is equal to the surface temperature of an ideal black-body radiator in Kelvin heated by thermal radiation. When the black body radiator is heated to high temperatures, the heated black body emits colors starting at red and progressing through orange, yellow, white, and finally to bluish white. The Planckian locus starts out in the red, then moves through the orange and yellow, and finally enters the white region. The color temperature of a light source is regarded as the temperature of a Planckian black-body radiator that has the same chromaticity coordinates. As the temperature of the black body increases, the chromaticity location moves from the red wavelength range toward the center of the diagram in Fig. 2.



**Text 3**

What is the reason for using the following commas?

Use commas to separate an **introductory phrases and subordinate clauses** from the subject

The color temperature of a white light is defined as the temperature of an ideal Planckian black-body radiator that radiates light of comparable hue to that white light source. The color temperature of light is equal to the surface temperature of an ideal black-body radiator in Kelvin heated by thermal radiation. When the black body radiator is heated to high temperatures, the heated black body emits colors starting at red and progressing through orange, yellow, white, and finally to bluish white. The Planckian locus starts out in the red, then moves through the orange and yellow, and finally enters the white region. The color temperature of a light source is regarded as the temperature of a Planckian black-body radiator that has the same chromaticity coordinates. As the temperature of the black body increases, the chromaticity location moves from the red wavelength range toward the center of the diagram in Fig. 2.



Subordinate clauses at the beginning of a sentence can be used to link back to previous information.



The color temperature of a white light is defined as the temperature of an ideal Planckian black-body radiator that radiates light of comparable hue to that white light source. The color temperature of light is equal to the surface temperature of an ideal black-body radiator in Kelvin heated by thermal radiation. When the black body radiator is heated to high temperatures, the heated black body emits colors starting at red and progressing through orange, yellow, white, and finally to bluish white. The Planckian locus starts out in the red, then moves through the orange and yellow, and finally enters the white region. The color temperature of a light source is regarded as the temperature of a Planckian black-body radiator that has the same chromaticity coordinates. As the temperature of the black body increase, the chromaticity location moves from the red wavelength range toward the center of the diagram in Fig. 2.

Text 3

- A 15-minute break?  
–Ends 10:49

## Use of verbs

**Question:** In the text above (texts 1-3) by Chang et al. (2012), which voice (**active** vs **passive**) and verb tense (**past** vs **present**) are predominant?

**A:** active voice and present tense (text 1 & 3),

**Text 2** mix of active & passive and present perfect

Active (present tense)	Present perfect tense (often used to overview previous studies or trends)
LED application areas <b>include</b> ...	The use of LEDs in general lighting <b>has increased</b> ...
The heated blackbody <b>emits</b> ...	

Passive (present)
LEDs <b>are used</b> ...
General applications <b>are divided into</b> ...

## Use of verbs

Past tense + active voice (often used to report a specific previous research/study)
<u>Meneghini et al. [106]</u> <b>analyzed</b> the degradation of p-GaN contacts degraded under high-temperature storage at 250 C.
An electrothermal degradation study on In-GaN LEDs by <u>Pavesi et al. [72]</u> <b>also showed</b> that LEDs electrically stressed at 100 mA without a heat sink
<u>Barton and Osinski [149]</u> <b>also suggested</b> that yellowing is related to a combination of ambient temperature and LED self-heating. <b>Their</b> results <b>indicated</b> that a temperature of around 150 C was sufficient to change the transparency of the epoxy, causing the attenuation of the light output of LEDs.

Names of authors can be used write reader-friendly sentences and maintain cohesion. However, this varies across journals and disciplines.



## Cohesion and paragraphing

- **Q:** Each of the three text examples begins with a special sentence. What is the name of this type of sentence?

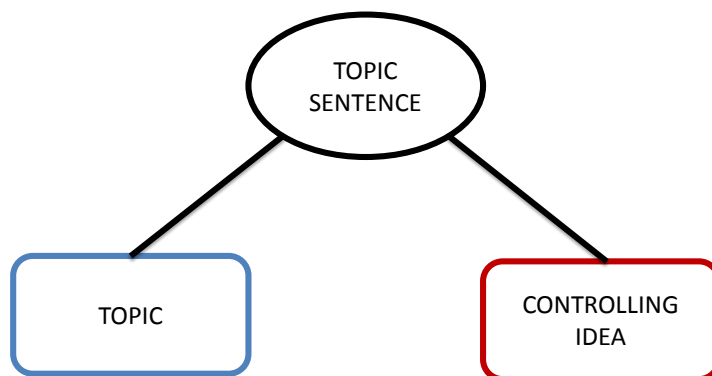
## Cohesion and paragraphing

1. Light emitting diodes (LEDs) are a solid-state lighting source increasingly being used in display backlighting, communications, medical services, signage, and general illumination [1–6].
2. LED application areas include LCD backlights, displays, transportation equipment lighting, and general lighting (see Table 1).
3. The color temperature of a white light is defined as the temperature of an ideal Planckian black-body radiator that radiates light of comparable hue to that white light source.

## Cohesion and paragraphing

- **Q:** Each of the three text examples begins with a special sentence. What is the name of this type of sentence?
- **A:** a topic sentence

Topic sentence = general statement  
about the paragraph



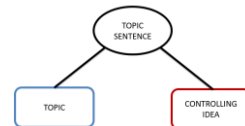
## Cohesion and paragraphing

1. **Light emitting diodes (LEDs)** are a solid-state lighting source increasingly being used in **display backlighting, communications, medical services, signage, and general illumination** [1–6].
2. **LED application areas** include **LCD backlights, displays, transportation equipment lighting, and general lighting** (see Table 1).
3. **The color temperature** of a white light is defined as the **temperature of an ideal Planckian black-body radiator** that radiates light of comparable hue to that **white light source**.

Topic and controlling ideas are repeated in the paragraph to maintain cohesion



## Types of topic sentences



1. New topic (neutral)
2. Enumeration (neutral or claim)
3. Claim

## Types of topic sentences



### 1. New topic (neutral)

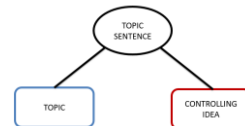
The **Finnish higher education system** consists of **universities** and **polytechnics**.

What kind of information could appear in the rest of the paragraph?

→ Definitions and descriptions.

See also: <http://sana.aalto.fi/awe/cohesion/topsen/new/index.html>

## Types of topic sentences



### 1. New topic (neutral)

The **Finnish higher education system** consists of **universities** and **polytechnics**. **The universities** stress the connection between research and teaching. **The basic purpose of the universities** is to carry out scientific research and to provide teaching in related subjects. **Students at universities** may take a lower (Bachelor's) or higher (Master's) academic degree, as well as academic further education, consisting of licentiate and doctoral degrees. **Universities** also arrange further education and open university teaching. In contrast, **polytechnics** emphasize a connection with working life, and the degrees offered are higher education degrees with a professional emphasis. Located throughout Finland, **universities** and **polytechnics** aim to ensure that all prospective students have equal opportunities for study, regardless of where they live.

## Types of topic sentences



### 2. Enumeration (neutral)

**One method for predicting the lifetime of LEDs** is the use of an **accelerated test approach** where the estimated lifetime in the accelerated life tests is multiplied by an acceleration factor. **The process involves four steps:**

What kind of information could appear in the rest of the paragraph?

→ A list of steps (=4) and their short descriptions

Adapted from Chang et al (2012). *Light emitting diodes reliability review*.

#### Note

- the parallel structure using – ing
- the proper **use of semicolon ;** in separating the complex list items

## ences



**One of LEDs** is the use of an estimated lifetime in the accelerated life tests is multiplied by an acceleration factor. **The process involves four steps:** (1) **measuring** the light output of samples at each test readout time; (2) **estimating** LED life under the accelerated test conditions (using functional curve fitting of time-dependent degradation under the test conditions) or finding observed lifetime for L50 or L70, as shown in Fig. 4; (3) **calculating** an acceleration factor; and (4) **predicting** lifetime under the usage conditions by using the acceleration factor multiplied by the lifetime of the test condition, as shown in Eq. (1):

Adapted from Chang et al (2012). *Light emitting diodes reliability review*.

## Types of topic sentences



### 3. Claim

Finnish is an **easy** language to learn.

What kind of information could appear in the rest of the paragraph?

→ Evidence supporting the claim

<http://sana.aalto.fi/awe/cohesion/topsen/claim/index.html>

## Types of topic sentences

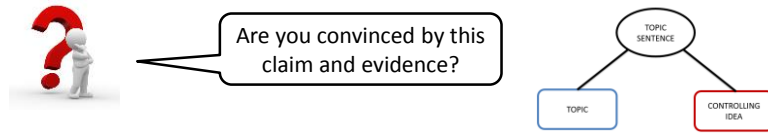


### 3. Claim

**Finnish** is an **easy** language to learn. It is written the way that it is pronounced. Finnish has no articles (i.e., *a, an, the*), nor does it distinguish between masculine and feminine forms, as do other European languages, such as Spanish, French and German. Thus, Finnish makes no distinction between she and he; one word **hän** serves for both sexes. **Another feature** that makes Finnish easy to learn is that words are formed from common “roots”, thus learning the the word **kirja** (*book*) quickly opens the way to learning other related words, including **kirjasto** (*library*), **kirje** (*letter*), and **kirjoittaa** (*to write*). Furthermore, Finnish has no separate preposition words (e.g., *to, from, on, in*). Instead, they are all simply added to the end of words.

<http://sana.aalto.fi/awe/cohesion/topsen/claim/index.html>





### 3. Claim

**Finnish** is an **easy language to learn**. It is written the way that it is pronounced. Finnish has no articles (i.e., *a, an, the*), nor does it distinguish between masculine and feminine forms, as do other European languages, such as Spanish, French and German. Thus, Finnish makes no distinction between she and he; one word **hän** serves for both sexes. **Another feature** that makes Finnish easy to learn is that words are formed from common “roots”, thus learning the the word **kirja** (*book*) quickly opens the way to learning other related words, including **kirjasto** (*library*), **kirje** (*letter*), and **kirjoittaa** (*to write*). Furthermore, Finnish has no separate preposition words (e.g., *to, from, on, in*). Instead, they are all simply added to the end of words.

- The later sentences provide evidence to support the claim

<http://sana.aalto.fi/awe/coheslon/topsen/claim/index.html>

Chang et al (2012). *Light emitting diodes reliability review*.

## TEXT PART 4

## Topic sentences

Does the first sentence include

- 1) a topic?
- 2) a controlling idea?
- 3) If yes, what are they?

### 3. Failure modes and mechanisms in LEDs

In this paper, the failure mechanisms of LEDs are divided into three categories: the semiconductors, interconnects, and the package. Semiconductor-related failure mechanisms include defect and dislocation generation and movement, die cracking, dopant diffusion, and electromigration. Interconnect-related failure mechanisms are electrical overstress-induced bond wire fracture and wire ball bond fatigue, electrical contact metallurgical interdiffusion, and electrostatic discharge. Package-related failure mechanisms include carbonization of the encapsulant, delamination, encapsulant yellowing, lens cracking, phosphor thermal quenching, and solder joint fatigue. This section discusses the various failure mechanisms of LEDs.

Text 4

Yes, all the recommended elements are included in the sentence and the paragraph.



Topic

In this paper, the **failure mechanisms of LEDs** are divided into **three categories**: the semiconductors, interconnects, and the package.

Controlling ideas

### 3. Failure modes and mechanisms in LEDs

In this paper, the **failure mechanisms of LEDs** are divided into three categories: the **semiconductors, interconnects, and the package**. **Semiconductor-related failure mechanisms** include defect and dislocation generation and movement, die cracking, dopant diffusion, and electromigration. **Interconnect-related failure mechanisms** are electrical overstress-induced bond wire fracture and wire ball bond fatigue, electrical contact metallurgical interdiffusion, and electrostatic discharge. **Package-related failure mechanisms** include carbonization of the encapsulant, delamination, encapsulant yellowing, lens cracking, phosphor **thermal quenching, and solder joint fatigue**. This section discusses **the various failure mechanisms of LEDs**.

Text 4

## Colons [:] and listing

In this paper, the LED's **failure mechanisms** are divided into **three categories**: the semiconductors, interconnects, and the package.

In this paper, the **failure mechanisms of LEDs** are divided into **three categories**: the semiconductors, interconnects, and the package.

Exemplary use of a **number + superordinate noun + colon** in listing.

Comma indicates the **subject** in the sentence (i.e., *the failure mechanisms of LEDs*).



The keyboard of a computer  
**The computer keyboard**

## Types of “familiar” or repeated information

1. Direct repetition
2. **This/These** + repeated noun/superordinate
3. Demonstrative pronoun (**this/ these + Ø**)
4. Repetition using pronouns (**it/ they**)
5. Synonyms

## 1. Direct repetition

### A. Use generic forms [a(n), Ø+ plural, the + singular]

**A solar panel** is a packaged interconnected assembly of solar cells. **The solar panel** is used as a component in a larger photovoltaic system to offer electricity for commercial and residential applications. **Solar panels** use light energy (photons) from the sun to generate electricity through the photovoltaic effect.

**A dipole antenna** consists of two conductors extending in opposite directions, with a total length that is often a half of a wavelength long. **Dipoles** are typically oriented horizontally in which case they are weakly directional.

## 1. Direct repetition

### B. The + Repeated noun with variation

**An electromagnetic wave refractor** in some aperture antennas is a component which selectively delays or advances portions of the electromagnetic wavefront passing through it. **The refractor** alters the spatial characteristics of the wave on one side relative to the other side.

**Carbonization of the plastic encapsulation material** on the diode surface under electrical overstress ... **Carbonization of the encapsulant** ...

## Types of “familiar” or repeated information

### 1. Direct repetitionC. Use acronyms

A **light-emitting diode (LED)** is a semiconductor light source. **LEDs** are used as indicator lamps in many devices, and are increasingly used for lighting. The color of **an LED** is determined by the semiconductor material, not by the coloring of the plastic body.

### 2. **This/These** + repeated noun/superordinate

By using a **this/these** or **such (a)** plus the exact term or a superordinate

Reflection of the original signal also occurs when it hits an extended conductive surface, in a fashion similar to a mirror. **This effect** can also be used to increase signal through the use of a reflector, normally placed behind the active element and spaced so the reflected signal reaches the element in-phase.

### 3. Demonstrative pronoun (**this/ these + Ø**)

Use 'bald' **this/these** to refer back to an entire idea or sentence.

The radio signal's electrical component induces a voltage in the conductor. **This** causes an electrical current to begin flowing in the direction of the signal's instantaneous field.

### 4. Repetition using pronouns (**it/ they**)

By substituting a recently topical noun with **it/ they**.

**Yagi-Uda array** uses passive elements to greatly increase gain. **It** is built along a support boom that is pointed toward the signal.

## 5. Synonyms or collective nouns

Students often bring their **smartphones, laptops or tablets** with them to the classroom. In addition to taking notes, **such devices** can be used in a variety of ways to enrich classroom teaching.