## aalto-logo Cohesion

**Quick grammar check**

In Friday’s class, the students solved a rather complex problem.

**Task 1**

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| **Version A** |  | **Version B** |
| **1**The application of science to the creation of useful devices to meet the needs of society is called mechanical engineering. **2**The design, manufacture, operation and maintenance of a wide variety of machinery are the focus of a mechanical engineer’s work. **3**Jet engines and minute instruments for use in medicine are amongst the products designed by mechanical engineers. **4**Engineering drawings of the devices which are to be produced are created by mechanical engineers. **5**Manual work was the normal means of creating drawings before the late 20th century, but computer-aided design (CAD) programs have been used to create drawings and designs since the use of computers became widespread. **6**Three-dimensional models can be used directly for manufacturing the devices thanks to modern CAD programs.  |  | **1**Mechanical engineering is the application of science to the creation of useful devices to meet the needs of society. **2**Mechanical engineers focus on the design, manufacture, operation and maintenance of a wide variety of machinery. **3**The products of their work range from jet engines to minute instruments for use in medicine. **4**Mechanical engineers usually create engineering drawings of the devices which are to be produced. **5**Before the late 20th century, drawings were usually made manually, but the widespread use of computers has now enabled the creation of drawings and designs using computer-aided design (CAD) programs. **6**Modern CAD programs allow engineers to produce three-dimensional models, which can be used directly in the manufacture of the devices depicted.  |

1. Place “Familiar” before “New” information

http://sana.tkk.fi/awe > Cohesion > Information Ordering > The "Given-New" principle

1. **Constant Topic**

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| FAMILIAR | NEW | 1**Compressed** **hydrogen tanks** are made from a strong but lightweight material such as carbon fiber. 2Currently, **these systems** carry about 5,000 pounds per square inch of hydrogen, but the goal is 10,000 psi to improve vehicle range. 3For safety purposes, **the tank** must have a burst strength at least twice the pressure of the fuel. 4Thus, **the tanks** must be made from materials that are either very heavy or very expensive. 5**These** **tanks** are also quite large, creating packaging problems in the vehicles. |
|  1**…hydrogen tanks** are made from…2…**these systems** carry…3…**the tank** must have… 4… **the tanks** must be made from….5**These** **tanks** are also quite large… |

1. **Step-wise Topic**

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| .1Solid organic waste is fed into a coarse *shredder* and cut into pieces. 2**The shredded pieces** are more finely ground into a paste before being *mixed* with manure and bio-sludge. 3**The mixture** is transported to a primary mixing tank where it is undergoes a *homogenization process*. 4**The homogenized biomass** is pumped into two *pasteurization tanks*, where it is held at 70 °C for one hour to produce a bacteria-free *slurry*. |  | 5The **pasteurized slurry** enters a digester where it undergoes *methane fermentation* at 38 °C for 20-24 days. 6**The fermentation process** yields *methane* at concentrations as high as 60-70%. 7**This biogas** is recovered and used for generating power at the power generation facility, and **the digested slurry** is returned to the farmers as organic fertilizer. |

1waste …**shredder** and cut into pieces*.*

 2The shredded pieces … **mixed** with manure and bio-sludge.

3The mixture … a **homogenization** process.

4The homogenized biomass … **pasteurization** tanks...

5The pasteurized slurry …*methane* **fermentation**...

6The fermentation process yields…

1. **Hypertopic**

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| FAMILIAR | NEW | 1Proton exchange membrane (PEM) fuel cells face **several challenges**. 2**Platinum catalysts** are expensive and also subject to CO poisoning from hydrocarbon fuels. 3For this reason, catalyst improvements, non-precious metal catalysts and other alternatives are currently under intensive investigation. 4**New** **membranes** more resistant to chemical impurities are also being developed. 5Alternative **storage methods**, such as metal hydrides and carbon nanostructures, may address hydrogen storage limitations that have prevented fuel cell cars from achieving a typical driving range (300-400 miles/tank). 6**Cold starts** from frozen internal water are improving, though the DOE’s goal of cold starts at -20°C in 30 seconds or less has yet to be achieved. |
| 1… PEM fuel cells face**several** challenges.2**Platinum catalysts** are expensive and....3For this reason, catalyst improvements…4**New** **membranes** more resistant to…5… **storage methods**, such as...6**Cold starts** from frozen internal water |

**Task 2**

1. 1Schematics for electronic circuits are prepared by designers using Electronic Design Automation (EDA) tools called schematic capture tools or schematic entry tools. 2These tools go beyond simple drawing of devices and connections. 3Usually, they are integrated into the whole IC design flow and linked to other tools for verification and simulation of the circuit under design.
2. 1Fender is the American term for that part of an automobile, motorcycle or other vehicle body that frames a wheel well (i.e., the fender underside). 2The primary purpose of a fender is to prevent mud, rocks, and other road debris from being thrown into the air by the rotating tire. 3Because they are rigid and can be damaged by contact with the road surface, fenders typically include flexible mud flaps close to the ground where ground contact may occur. 4In British English, the fender is called the wing, which may also refer to either the front or rear bumper.
3. 1A corrective lens is a lens worn in front of the eye to treat optical defects of the eye, such as myopia, hyperopia, astigmatism, and presbyopia. 2Corrective lenses can be divided into three types: glasses, contact lenses, and intraocular lenses. 3Glasses or "spectacles" are worn on the face a short distance in front of the eyes. 4Contact lenses are worn directly on the surface of the eye. 5Intraocular lenses are surgically implanted most commonly after cataract removal.
4. 1Simulation is a powerful tool for understanding the dynamics of complex systems. 2A simulation involves the development of a model to represent a real system and the experimental manipulation of that model to gain an understanding of how the real system might behave under various circumstances. 3Models may be purely physical, such as a wind tunnel, or logical, as represented in a computer program. 4Building computer models of complex systems has allowed decision makers to develop an understanding of the performance of the systems over time.

2. Place “Light” before “Heavy” Noun Phrases

http://sana.tkk.fi/awe > Cohesion > Information Ordering > The "light-before-heavy" principle

English prefers sentences that contain a **short subject**, come quickly to the verb and then continue as long as needed. However, what is most undesirable are sentences that are "top-heavy". In other words, you should avoid overloading your reader by placing heavy elements at the beginning of the sentence. Instead, English prefers "heavy-bottomed" sentences —those that place most of the information at the end of the sentence **after** the verb. Remember, English is a **Subject-Verb-Object** language!



Ending clauses and sentences with a verb creates "top-heavy" sentences that seem badly imbalanced. Instead, good writers try to place the verb as soon as possible after the subject of the sentence. This can clearly be seen in the example below. There is such a strong need to avoid placing the **verb** at the end that native speakers feel compelled to place a *noun phrase* (e.g., *The environmental effects of … warming*) after the verb in order to create a sentence that feels more "balanced". There are numerous strategies that you can use as a writer to help balance your sentences. The next page lists some of the most common.

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| Description: sad | The effects of increasing atmospheric carbon dioxide and methane levels on the global warming **were analyzed.**The effects of increasing atmospheric carbon dioxide and methane levels on the global warming **are analyzed** **in this paper**. |
| Description: smile | **This paper** **analyzes** the effects of increasing atmospheric carbon dioxide and methane levels on the global warming. |

Strategies for Re-ordering Information

These are some strategies which may be useful if your sentences are top-heavy or end with a verb.

1. **Passive-Active Alternation**

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| **Engineers** need good English language skills. **[active]**Good language skills are needed by **engineers. [passive]** |

1. **Equative Shift**

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| **One form of pollution that has received much attention** IS air pollution.Air pollution IS **one form of pollution that has received much attention**. |

1. **Animate-Inanimate Shift**

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| **In this report,** systemsthat use speech recognition are described. **Ø This report** describes systems that use speech recognition. |

1. **Personal-Impersonal Shift**

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| **dangerIn this report,** systemsthat use speech recognition are described.**In this report, we** describe systems that use speech recognition. |

1. **Means-Purpose Shift**

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| The humidity ratio was calculated (by) using Equation 8.Equation 8 was used to calculate the humidity ratio. |

1. **Introductory “It” (dummy subject)**

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| **Adding** heat and **raising** the temperature of the gas **would be** necessary.It **would be** necessary **to heat** and **raise** the temperature of the gas. |

1. **Existential “There” (dummy subject)**

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| dangerA processor overhead associated with reconfiguration is available.There is a processor overhead (that is) associated with reconfiguration. |

1. **Resultative non-finite clause (*so that* ---> *thus* + -*ing*)**

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| The laser light forms an EM field, **so that** the vibration of the atoms is slowed.The laser light forms an EM field, thus slowing the vibration of the atoms. |

1. **Purpose clause (*so that* ---> *to* infinitive)**

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| The algorithm selectively clones a procedure, **so that** the code can be optimized.The algorithm selectively clones a procedureto optimize the code. |

1. **Split relative clause (that / which)**

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| An algorithm thatcan facilitate fast image browsing is proposed.An algorithm is proposed thatcan facilitate fast image browsing. |

1. **Nominalization (verb ---> noun)**

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| Health experts fear that **technology addiction** will increase. [increase = verb]Health experts fear an increase in **technology addiction**. [increase = noun] |

1. **When / before / after + -ing**

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| Economical feasibility is an important factor when **a PMR solution** is selected.Economical feasibility is an important factor when selecting **a PMR solution**. |

1. **Reorder clauses**

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| Various algorithms **to** **generate** testing automata have been developed.Various algorithms have been developed **to** **generate** testing automata. |

1. **Find a default subject (*e.g., this thesis, this work, research*)**

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| Many gesture measuring devices for computer input have been devised.**Many researchers** have devised gesture measuring devices for computer input. |