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Basic Sentence Formulas

Note: These sentence formulas give you the power to create strong sentences. We strongly encourage you to also use these reference books.

- *A Scientific Approach to Writing for Engineers and Scientists* by Robert Berger, published in 2014 by Wiley-IEEE Press.
- *The IEEE Guide to Writing in the Engineering and Technical Fields* by David Kmiec and Bernadette Longo in 2017 by Wiley-IEEE Press.

Basic Sentence Formula #1

A period goes between two complete sentences.

Remember: A complete sentence, also called a "core sentence," is a subject + a predicate. A predicate must have a verb and might also have an object.

Subject + *verb* + **object**. Subject + *verb* + **object**.

predicate predicate

Examples

I *completed* **the materials manifest**. We *can send* **it**.

The software *was* **updated** yesterday. The old version *had* **bugs.**

Management *has decided* **against hiring new staff**. There *is* **a freeze** on new projects.

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Basic Sentence Formula #1, enhanced

A period goes between two complete sentences that include restrictive adjective clauses.

Subject + *verb* + **object** with a restrictive adjective clause.

predicate

Subject + *verb* + **object** with a restrictive adjective clause.

predicate

Examples

We *should use* motion **sensors** that can estimate position change over time.

The L3 vehicles *include* **designs** that release the driver from monitoring the environment at all times.

The technicians *have discovered* **inconsistencies** on how these tests are run. Density test procedures *should follow* **procedures** that are standardized across departments.

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Basic Sentence Formula #2 (See Lesson 3 Writing)

A core sentence can be modified with restrictive or nonrestrictive adjective clauses.
Remember, the predicate is the *verb* (+ **object**).

Subject, nonrestrictive adjective clause, *verb (+* **object)**. (nonrestrictive form)

or

Subject restrictive clause + *verb (+* **object)**. (restrictive form)

Examples (predicates not indicated below, in order to simplify the diagrams)

In-house tests, which were just completed yesterday, *confirm* **that the alloy material is strong enough for the weight-bearing columns.**

The ISO standards that were published in 2013 *were* substantially *updated* in 2015.

The team that is underperforming *will be eliminated*, and the team that is meeting its objectives *will be retained*.

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Basic Sentence Formula #3 (See Lesson 4 Reading)

Qualifier, + core.

Examples

Usually, engineers understand advanced calculus.

Traditionally, lidar (light detection and ranging) technology works by sending out pulses of laser light and measuring how long it takes for the light pulses to bounce back.

Instead of the "old" lidar functionality, their invention pushes laser light continuously instead of in pulses and bypasses the need for algorithms.

By the end of the first couple of months, I was independently responsible for the software and tests covering the data link layer negotiation portion of the emulator.

Because the solar panels can rotate with the sun, we can optimize energy-gathering potential for almost any installation.

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Basic Sentence Formula #4 (see Lesson 7)

Core sentence; core sentence.

or, stated another way,

Subject + predicate; subject + predicate.

**The key to this formula is the semicolon; it indicates a relationship between the two ideas expressed in the core sentences. **

Examples

Update the software overnight; you will avoid problems.

Sensors can detect light; they then convert that input to an electrical output.

A complete lack of light will trigger a fail state; the sensor will register 0 V as the output.

The value obtained by the sensor is mapped to a value between 0 and 255; that number then determines the duty cycle of a pulse-width modulated output, which controls LED brightness.

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Basic Sentence Formula #5 (see Lesson 7)

Core sentence; transition, core sentence.

or, stated another way

Subject + predicate; transition, subject + predicate.

It is important to use a comma after the transition in this formula.

Examples

Collecting devices for e-waste reclamation is a move in the right direction when it comes to sustainable practices; however, extracting the harmful or valuable materials from those devices is a complicated process.

Sustainability is a core value; however, costs are too high.

Logrify could continue to do business as usual; however, the opportunities to innovate the way we source manufacturing materials should not be overlooked.

Our proposed double action would promote Logrify as responsive to the community and to stakeholders; therefore, we hope to gain support from the LWRA committee.

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Lesson 4 Glossary

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agile (adjective): for engineering and technical work, meaning to make a small change quickly, assessing its impact, and then adjusting the work for improvements; often done in a cyclical pattern of continuous improvement.

agriscientist (noun): scientist who specializes in biological and agricultural development.

allowances (noun, plural): affordances; accommodations; tolerances.

big picture (idiom): the overarching driver or concept for a project.

earth works (noun): engineering works created by processing part of the earth's surface involving either quantities of soil or unformed rock. In addition to roadways, earth works include land grading to reconfigure a site or to stabilize an area.

entities (noun, plural): companies, organizations or corporations.

ever-changing (adjective): always changing; not stable or predictable.

humbled (adjective): feeling modest, not of great importance.

infestation (noun): the state of being filled or overrun with pests or parasites.

lidar (noun; also, liDAR or LIDAR or LiDAR): a surveying method that measures distance to a target by illuminating it with pulsed laser light and measuring the reflected pulses with a sensor. Short for light detection and ranging.

photogrammetic (adjective): related to photogrammetry, the practice of surveying using digital photography.

[to] prioritize (verb): to determine the relative importance of tasks or jobs.

real-world (adjective): not theoretical or imagined.

terrestrial (adjective): relating to the earth or soil.

tract (noun): a parcel or plot of land.

[to] triage (verb) : to select as objects of attention those cases with the greatest need or urgency first (adapted from medical terminology).

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Lesson 4 Grammar Resource: Future Forms; Preferences

Structure	Key uses	Special note
<u>Future forms</u>		
will	• Prediction —The order will arrive soon. • Intention —I'll analyze it for you. • Willingness —Yes, we'll give you support. • Refusal —He says he won't do it.	Needed in cause and effect sentences (if..then) —If we lower the temperature, the liquid will freeze.
(be) going to	• Prediction —The trusses are going to hold steady. • Stating an intended plan —We're going to run a diagnostic test next.	In running speech may sound like *gonna* (not recommended)
Present continuous	• Predicting near future —He's using the spectroscope Tuesday.	Usually for events to take place within a matter of days.
Simple present	• Predicting near future —-They determine the best coordinates tomorrow.	Usually for events to take place within a matter of days; often refers to a plan

About to	• Immediately pending future —Stop! The fuse is about to ignite!	For events to take place within minutes or hours
<u>Preferences</u>		
Would like, would prefer, would rather	• Polite preferences —She'd like to manage the logistics herself. —He'd prefer to develop the software internally. —They'd rather begin with the second phase.	Is usually contracted: I'd like, I'd prefer, I'd rather. *Would like, would prefer are followed by the* infinitive of the verb. Would rather is followed by the simple verb.
<u>Disagreement</u>		
Auxiliary verb, simple form + not	• To disagree or contradict —No, it does ***not*** depend on extra resources.	Could be considered impolite

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Lesson 4 Transcript

For explanations of terms in bold, see the glossary.

Shou: Thank you for your kind introduction. I have heard a lot of interest from many of you about lidar developments in China, with particular attention given to consistency of performance, as well as to which functions we have been adapting. At the Shanghai Municipal Center, we're working to prioritize how and when we use lidar: that is, we **triage** our adoptions according to most pressing needs in what is one of the world's largest metropolitan areas. This means that firefighting and law enforcement installations are primary, and I'll be focusing today on those areas. As you might imagine, speed and accuracy in addressing urban emergencies was our main concern and motivation for the adoption of lidar. I won't concentrate as much on health care and autonomous vehicles today, although those areas are slated for thorough research through the remainder of this year.

Al-Fouzi: Thank you as well. I'm humbled to be here today as a non-engineer, but I do think my analyst perspective may be useful in looking at what Limitless, at Dubai World, is currently attempting. Limitless is a real estate company located in Dubai and one of the city's largest business entities. I'm presenting today on the Arabian Canal, which is proving to be the largest and most complex civil engineering project ever conducted in the Middle East, to quote Al Jeerza. When done, by 2022, the canal will be 75 kilometers long and will require multiple monitoring systems. This means both **photogrammetic** and Lidar mapping technology for supervision of the **earth works.** What you'll see today are visualization slides from our partner, Navmatica, who developed customized tools for that purpose.

Derkies: Mr. Al-Fouzi speaks of being humbled: I feel even more so because I can't claim to talk about large-scale urban management systems, but, rather, forestry. As an **agriscientist**, I work with the Harvard Forest Megaplot, which is a section of wooded **tract** which is proving extremely useful for the study of mortality of hemlock trees. We're working with funding from the Smithsonian Institution to investigate the increasing damage done by a particular insect, the hemlock woolly aldelgid, or

HWA, on eastern hemlock trees. To characterize how the forest is rapidly changing due to the HWA **infestation,** we use lidar instruments to capture information on the 3D space of the forest over time. We use both airborne and terrestrial lidar to capture information both above and below the forest canopy. We're starting to look, too, at how lidar can identify long-term changes to the carbon and water cycles in New England.

Moderator: Thank you, panelists. To our audience...this year, we decided to expand beyond our normal choices of engineering and technical specialists to broaden our understanding of all possible lidar applications. I'm confident that these specialists will be excellent representatives of other valuable fields in that respect. We'll now be hearing from each for 20 minutes, followed by a Q&A period. We won't have time for extensive questions from the audience, but we will certainly have time for at least five or six i**nquiries**. After that, you are more than welcome to contact presenters individually using the contact information listed in the conference proceedings.

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Lesson 4 Listening Transcript 2

1. I'll leave the conference Saturday morning.
2. I'll live and work in a new state next year.
3. I'll lend some expertise to Mr. Sanders' project.
4. I'll end some continuing snags with a new solution.
5. She'll lay the groundwork for the planned launch.
6. She'll aim to produce a new schedule by September.
7. He'll link the web interface to our platform.
8. He'll ink his signature on the contract by next week.

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Lesson 4 Reading Excerpt

From Roberto's online magazine

Traditionally, lidar (light detection and ranging) technology works by sending out pulses of laser light and measuring how long it takes for the light pulses to bounce back. It was initially created as a surveying tool for hard-to-reach places like the surface of the Moon. A pulse of light would go out, and a sensor would detect how long it took for the light to return and would translate that time into distance. Those distances can be compiled to create a 3D map of the desired region.

The newest advancement in lidar technology has been created by Soroush Salehian and Mina Rezk. They claim that their product, part of their company Aeva, leaps over other current lidar systems because it has improved performance overall. Instead of the "old" lidar functionality, their invention pushes laser light continuously instead of in pulses and bypasses the need for algorithms. Their "4D lidar" sensor system processes velocity in real time, which is a compelling element for any autonomous vehicle. The inventors claim that, using their advancements, their system syncs up depth, object placement, position, and velocity all at once. Thus, their system can "see" not only the road but other cars, objects, and important details at once and immediately.

From Myra's online source

For our company to be competitive, we must reduce our TTM (time to market) for our next generation of products. In the past five years, we have moved away from traditional supply chain systems to more lean processes, including just-in-time supply chain management. In addition, we now want to improve our preventative maintenance practices so that all of our manufacturing processes are healthy at any given moment.

One of the possible means to make our delivery systems more efficient is to deploy additive manufacturing (AM) processes. From its beginnings in the 1980s, AM has had a healthy upswing in its capabilities and sophistication. Until recently, AM could only perform conceptual modeling; this means that it was useful for assessing whether forms and materials were appropriate. New developments with advanced 3D printing have taken AM to new levels. Thus, we will be able to assess form and full functionality, as well.

Right now, we have considerable expertise inside the company at the managerial level to enhance our lean manufacturing processes and procedures. Similarly, we can rely on our engineers to research and deploy AM and enhanced 3D printing technologies for our custom components.

The management believes that a focused team should look into the impacts that AM could bring to our delivery schedules. If we can reduce our TTM by 15% over the next two fiscal years, it may be

worth creating clusters of expertise inside our company to refine the process. On the other hand, if our immediate assessment is that deploying AM in these early stages will cost more than we get in return, we will not pursue AM now.

Nevertheless, the possibility of AM and how it could affect our bottom line could be a boon to our manufacturing and deliverable processes. A quicker, more reliable, and more robust process reflects our motto of “Better, Sooner, Reliably.”

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Lesson 4 Reading. Excerpt 2

for Quiz 2

logrify

Year-End Brief

With the widespread availability of Google Maps® in 2005, it became apparent that the world of sensors, mapping, and self-driving vehicles was on the horizon. Google Maps' enhancements continued to grow. We now see computer generated maps, photographed street views, and satellite views of much of the mapped world -- urban, rural, and primitive -- all housed in the Google sphere.

Many experts believe that the presence of Google Maps marked a conceptual shift for car manufacturing the world over. Once the power and saturation of Google mapping became clear, car makers were quick to make design changes to how drivers used their vehicles. Because a user's Google account is linked by email, drives, assistive features, and an ever-growing host of Google-linked services all powered by ubiquitous algorithms that infiltrate almost every web search, car makers saw an easy selling point. By placing interactive screens in cars that had web connectivity, car makers could market their products as revolutionary. The marketing departments were excited to tell the public that they could decide on a driving route while on their phone or laptop, and then have that mapped route available instantly once in the car by use of interactive screens that had web service.

However, the simple idea of an interactive screen installed in a car is an incremental design enhancement, not a major shift in the car-making paradigm. In our industry, the leaders in the next decade will be the companies that will be able to disrupt the entire paradigm and structure of how we all perceive personal vehicles and how they serve human needs.

From the continued work on providing seamless links and functionality between the API (application program interface), our sensors, and mapping technologies like Google Maps, the work at Logrify will continue to harness the expertise of engineers from fields such as computer science, electrical, physics, civil, infrastructure, geotechnical, materials, aerospace, and others. What is the next big leap? It will be in autonomous vehicles, but some of the applications or advancements we may not have even imagined yet.

Logrify's work with sensors will have tremendous impact, and not only on car making. It has been said widely in discussions of "The Internet of Things" that all major technological and economic shifts in the next 10-20 years will be based on the magic of sensors. Those sensors not only sense, but they also gather, send, and return metadata that allow for experts to observe and understand patterns of human behavior that have (thus far) escaped notice. The cars, the phones, and almost any object that humans use in daily life have the potential to be points of information-gathering. Sensors are at the heart of the upcoming revolution.

As we move into the coming year, keep in mind not only daily tasks that allow our customers to value the work that we do. While we do our important daily work for our customers and clients, the management teams at Logrify encourage you

to think of the larger order changes that might be on the horizon. You might think that some of your ideas are crazy, and that is fine. From crazy ideas come true innovation.

To that end, in the coming year we will have several listening sessions for our experts to voice ideas, concepts, and innovations. Please watch for these company-wide announcements.
