

Appendix A Sentences Gone Bad

Introduction:

The sentences below were collected from EE241 Digital Design laboratory reports. They will be used to illustrate some of the ways that sentences go bad. I'd like to emphasize that these were written by good students. The problems are in some cases matters of basic English grammar, but more often the issues have to do with the intersection of technical terminology and English usage. Some of the points may seem minor, even trivial, and multiple solutions to some of the issues are certainly possible. Good English usage and precision in technical communication is important. It is likely to be the way someone will judge your technical competence in the absence of other information. I'm hopeful that something can be learned by following the reasoning in the discussion of each of these examples.

If you are looking for a useful exercise in technical English, try to identify the errors in each example prior to reading my comments. Better, try rewriting each yourself prior to looking at what I have suggested for each.

Example 1. (This and the following two examples are from a laboratory report in which each student designed and built a scrolling display.)

To display the message "grand theft auto" push DIP switch to on for ground.

This sentence, as it is, seems clear in its meaning. (The acronym "DIP" for a "Dual Inline Pin" device package is assumed to be understood by the reader, which is reasonable in this context.) What is clearly missing is a comma after "auto".

This raises an interesting issue. Should the comma be inside the quotation marks, "... auto," ... , or outside the quotation marks, "...auto", ... ? Proper English usage traditionally says that the comma should be inside the quotation marks. However, required technical usage for "strings" in programming, and perhaps other forms of communication, suggests that the comma should be outside the quotation marks, so that the message character sequence "grand theft auto" is not taken as including the comma symbol. (I have generally put the comma outside the quotes for a symbol or string, and inside the quotes for an actual quotation.)

A second issue is whether "DIP switch" (a set of switches in a DIP package) is singular or plural. The word "switch" (singular) answers that question. So why isn't there an article, "a" or "the", in front of "DIP switch"? There needs to be. Which? Since it is a particular DIP switch rather than just any DIP switch, the article "the" is called for. (One could argue that the particular switch on the multiple element "DIP switch" ought to be identified. However, for practical purposes one can assume that the individual switch to be used is identified somehow.)

The phrase "to on for ground" may be confusing. In normal usage, DIP switches are used to generate digital binary signals, with the "on" setting resulting in a low Voltage (ground), giving a logical "0". (This is somewhat counter intuitive.) Perhaps the "for ground" could be omitted, since the intent is to tell the reader how to set the DIP switch to get the desired message.

The mapping from switch settings to Voltage and logical levels could be explained later. The point is to limit the number of complex ideas encapsulated in one sentence.

Notice the verb "push." It is an imperative. Normally you do not want to be throwing imperatives at the reader. If you are the dictator of a small country, or some other type of boss, you can get away with issuing imperatives. If you are writing something to be read by a peer or a superior, be careful. Will the reader see you as issuing orders? Unless there is good reason to deviate, third person passive voice is preferred for technical writing.

The word "on" is not used in its normal manner, which would be a preposition. Here it is used to designate the state of the DIP switch. It is the label we see on the switch itself to see how to throw it. As a label, the word "on" should be in quotation marks. We are using it as a symbol, not a preposition. If we wanted to be more formal, we would write, "to the ON position." (Notice how many times in this one example sentence the quotation marks issue has come up!)

Notice also that "grand theft auto" is not corrected to "Grand Theft Auto". Reference to the title of a game should be capitalized for normal English. But here, the information being conveyed is the sequence of characters to be displayed, which is the choice of the designer. The designer apparently chose, for reasons unstated, to use all lower case characters. Imposing capitalization loses that information.

As revised:

To display the message "grand theft auto", the DIP switch is pushed to "on".

Example 2:

"My project did not function properly do to a problem with WINCUPL."

If you read this sentence out loud, there does not seem to be a problem. But as written, "function properly do" is confusing. The word "do" is a verb, and so is "function". The reader is confused. Was the project to do (solve?) a problem with WINCUPL?

The error is a substitution of the homonym "do" for "due". Homonyms sound alike, but their meanings are entirely different, and the spelling as well. This kind of problem often occurs due to overly hasty use of "spell check". If the originally typed word was "dx", spell checking may well provide a suggested correction of "do" instead of "due". Don't assume spell checkers understand what they are reading!

The word "problem" is not an error. However, a more specific a word, if one can be found, is helpful to the reader. In this case the problem was a compiler bug. It's worth saying so instead of leaving the reader wondering what sort of problem occurred. (One could use "error" if the word "bug" is considered too informal.)

The word "with" is a vague preposition. The problem was internal to the WINCUPL programmable logic compiler. So, the preposition "in" is more appropriate.

Usually in a technical report you don't want to use first person pronouns unless it is unavoidable. It comes across as putting emphasis on the person doing the exercise, rather than the technical substance. Third person is preferred.

As corrected:

The project did not function properly due to a compiler bug in WINCUPL.

Example 3:

For my scrolling display problems did occur with the GAL program and the characters that I was expecting to see on the scrolling display were not seen and characters that I was not expecting to see were shown on the display instead.

This is a good example of a “run-on sentence”. A lengthy sentence provides opportunities for the reader to become confused. It is better to break it up unless there is good reason to keep the sentence together.

This would seem to be a compound sentence, but a compound sentence should have semicolons or conjunctions with commas. In this case, the word “and” connects the three components. A comma is needed for each. So, the first fragment is “For my scrolling display problems did occur with the GAL program, and ...” Better, just let the first sentence fragment be a complete sentence by itself, using a period instead of the comma and conjunction.

A comma is also needed to separate the clause “For my scrolling display” from the subject, “problems”. (See the previous example concerning first person pronouns and the vagueness of the word “problem”. In this case the “problem” is still perhaps not understood, so greater specificity may not be possible.)

The second two fragments of the original sentence explain the problem: the wrong information is being displayed. Wouldn't it be simpler to just say it that way? The use of “I” and the verb “expecting” put a degree of subjectiveness into the observation that is usually undesirable. Why does it matter if what was displayed was unexpected? What is important is that it was incorrect.

Sometimes it is better to simply throw out a cumbersome sentence and replace it rather than trying to rework it, especially for a confused run-one sentence.

As corrected:

Incorrect characters were shown by the scrolling display due to problems in the GAL program.

Example 4: (This and the following five examples are from a laboratory exercise to design and demonstrate a traffic light controller.)

The traffic light controller lab was given to the designed based off of an intersection assigned in class.

First, the informal word “lab” is a problem. Does it refer to a facility or to an assignment, or perhaps something else? It is best to use “laboratory” for a facility and “laboratory exercise” for a discrete activity, assignment, or project undertaken in that facility.

It wasn’t the laboratory exercise itself that was assigned, but the particular details of the assignment, that is, which intersection to do. So, “assignment” (or an equivalent) may be needed after “laboratory assignment”. This is a bit of a problem since the word “assigned” appears later in the sentence, and repetition is undesirable. (Perhaps the problem can be avoided when that part of the sentence is looked at.)

The subject of the sentence is clearly ‘the traffic light controller laboratory exercise. The verb is “was given,” and with the preposition “to” added, it needs a noun for the object. Unless the word “to” is part of an infinitive “to (be?) designed”. Something is clearly not right here. But, it is hard to tell what is meant. If “to be designed...” Then the word “the” is the problem. If “to the designer” was intended, then a typographical error in the last letter of “designer” caused considerable confusion. The typo error seems more likely.

The phrase “based off of an intersection...” is perhaps correct English, but why is the words “off of” used? Typically a derived work is “based on” something given. The words “off of” here seem to imply a more radical departure from the original. Unless there is good reason, the preposition “on” is better.

In this same phrase, is “based” really the right word anyway? The assignment was to design a traffic light controller for the intersection. A particular intersection (a word seemingly worth using) is meant. “For” seems simpler and more to the point. So, the “assigned” in class can be simplified to just “in class” since “given to the designer” already conveys the action being reported. “Assigned” turns out to be redundant here.

As corrected:

The traffic light controller laboratory exercise assignment was given to the designer for a particular intersection in class.

Example 5:

This project detailed how to design a sequential machine used inside a traffic light controller.

Was the project to design a sequential machine, or to develop more general techniques that are used to develop sequential machines? That depends on what the “project” is. If “the project” is the assignment document itself, yes, it may include general techniques. If it is what the student actually does in the lab, then it is to build a particular machine. Here, the word “project” as used is simply a bit too vague to precisely convey exactly what is meant. Better, “The laboratory exercise was to design ...” The work “exercise” conveys more of a sense of carrying out the work.

The preposition “inside” feels problematic. It’s a relatively specific pronoun used to denote a condition when something is entirely contained by something else, usually in a physical or spatial sense. If the “traffic light controller” was a specific container, a box mounted on a pole say, this would make sense. In that case one would expect what would go inside would be a similarly physical component, perhaps a prototype circuit card. In this case, the less specific preposition “in” seems more appropriate.

The verb “used” is very general. Often it should be replaced by a more specific verb that conveys the nature of the utility more precisely. In this case, however, a better and simpler solution is to substitute the still rather general preposition “for” for “in.”

As corrected:

This laboratory exercise was to design a sequential machine for a traffic light controller.

Example 6:

The program for the GAL16V8D was used to design the system in a one hot machine design then the boolean equation were gathered together to form the outside logic to allow the traffic light to function properly.

This sentence is just plain confused. Part of the problem is that the nouns don’t seem to be well understood. The sense conveyed to the reader is that the writer doesn’t know what he is talking about; he doesn’t understand the basic elements he is discussing.

“The program” seems to be the subject, at least for the first component of the sentence. What is “the program”? The word “program” can mean many different things. The two most likely in this case are:

1. An executable “application” (a stand-alone program) that runs on a platform such as a computer, cellular telephone, or an embedded processor.
2. The source code (in C, MATLAB, or some other programming language) to develop an application (or a library or tool or some other form of executable software). In this case

the code would be in WinCUPL source, compiled to a fuse map (JEDEC file) to be loaded into the GAL device.

The confusion here is that the reader doesn't know if "the program" is WinCUPL, the application program used to develop the programming for the GAL, or the "program" meaning the source code (or its compiled forms) that is loaded into the GAL. In neither case is "was used to design the system" quite correct. If "the program" is WinCUPL, yes, it is a design tool. But instead of the vague verb "used", the more specific verb form "used to compile" would be preferred, and it would be better to identify the program as WinCUPL. On the other hand, if "the program" is meant to be the student's source code for the GAL (which WinCUPL is used to compile), then "used to design" is flat wrong. The student's code is part of the design itself, not a tool used to design.

In this case, we will assume that WinCUPL is meant, and substitute that for the vague word "program". That requires some additional wordsmithing to convey that the target programmable logic device is a GAL. Why, after the vagueness already encountered, does the writer insist on the precision of identifying the device specifically as a GAL16V8D rather than just as a GAL or a GAL16V8? The program for a "D" version of the device is exactly the same as for the others, so that is a detail meaningful only when actually zapping the program into the device.

A "one hot" method of design is one of the three prescribed techniques students used. The casual reader might not recognize that, however, so the use of quotation marks, and perhaps capitalization, to call attention to "One Hot" as a symbol designating a design technique, can be helpful.

A good place to break up this sentence is immediately after "machine design", since the subject changes radically. There is no reason to make this all one sentence. Indeed, the connecting word "then" calls attention to the sequential nature of the steps, or it would have had a comma been placed after "design".

The remainder of the sentence has a subject of "the boolean equation". This is singular because the noun "equation" is singular. The word "Boolean" needs to be capitalized, because it is derived from a person's name, Boole. Similarly, units of Volts, Amperes, Watts and Farads all are capitalized, but seconds isn't.

Now, look at the verb, "were gathered". That is plural. This is a grammar error called "numbers disagreement." The noun is singular but the verb is plural. Something is wrong. Is there only one equation, or multiple equations? Since they are "gathered together", the error is in the noun; it should be "equations". Notice that the article "The" is still appropriate, even though the subject is plural. We think of "the" as being a singular article. In this case, "The" calls attention to the fact that it is a specific set of equations (in a sense a singular entity made up of components) that is the subject. But, what specific equations? It's not an English problem. The reader can't tell to what equations the writer is referring.

The words "were gathered together to form the outside logic" doesn't make sense. What is "outside logic"? It's not a term I'm familiar with, or that I found defined. Speculating, I suggest perhaps it is the part of the design that is not included in the GAL. It takes intimate

familiarity with the project to jump to that conclusion. The writer needs to help the reader if that's what is meant.

The term “gathered together” is vague and non-specific. It's hard to understand what a designer actually does. Are they simultaneously solved? Gathered into the waste basket? Implemented using discrete logic? (Knowing more than the writer conveyed, it would seem to be the latter.)

The final clause, “to allow the traffic light to function properly” seems superfluous. Wouldn't any design be intended to operate properly?

As rewritten:

The program WinCUPL was used to compile the design for the GAL16V8 component of the system, for a “One Hot” machine design. Then the Boolean equations were developed and implemented for logic outside of the GAL.

Example 7:

The design was a success, it performed exactly how the scenario was supposed to.

A semicolon, not a comma, is used to connect the halves of a compound sentence.

What is “a scenario”? Usually a scenario is a sequence of events used as one particular exemplar for the behavior of a system. For a traffic light, different scenarios would be a set of different sequences in which vehicles might arrive at the intersection, and the traffic light signaling that should result in each such case. A scenario is usually not comprehensive or general. (A set of scenarios should be.) A state diagram is general, because it describes behavior completely. A set of scenarios (we've called them timing diagrams) can be used to derive a more general state diagram or table, and a state table can be used to generate example scenarios that can be used for test purposes.

The reason this is discussed is that the student refers to “the scenario” as if one was defined for the project (it wasn't). The demonstration should show that the traffic light controller handles all (or a representative subset) of scenarios which can occur. So, the problem here is the student used the word “scenario” incorrectly; he seems to have meant “prescribed behavior”.

The subject isn't quite right. A “design” is an abstraction, like a plan for construction. A design can be a success, but what actually operates is the machine built to the design. The word “circuit” is better than using the pronoun referring back to “the design”. While this is under consideration, the technical term for “design requirements” (what the system being designed is supposed to do) is a “specification”. Why not use a form of that very technically specific and appropriate word? The adverb “exactly” adds an emphasis here that may be taken as bragging. It's better omitted, unless there had been so much lack of faith in the designer that the emphasis is needed.

Also, a preposition is a bad word to end a sentence with.

As corrected:

The design was a success; the circuit performed as specified.

Example 8:

Once this was done the GAL flowed from state to state as it was intended to.

This sentence really isn't too bad. The word "flowed" to convey a sense of the operational behavior is unusual and surprising. State machines make discrete, discontinuous jumps in logic, rather than "flow", but the writer may reasonably have used this verb intentionally to convey a sense of smooth operation. I'll credit him with nice artistic imagery, and leave that unchanged.

As in many other problematic sentences, punctuation is needed. Modern usage seems to try to minimize punctuation, but a comma is required after "done" (the introductory clause) and after "state" before the conjunction "so", since this is a compound sentence. As in the previous example, "as specified" is a stronger statement of correct operation than "as it was intended to."

As corrected:

Once this was done, the GAL flowed from state to state as specified.

Example 9:

WINCUPL was used for the logic to determine when each of the six lights is on and off.

The verb "used" alone is very vague. The infinitive "to compile" conveys a precise sense of the utility of this programming tool. Similarly "the logic" could be made more precise. "Logic" comes in many forms. In this case, a "state machine specification" or "Boolean equations for state variables of a state machine" could have been meant. I'll guess the latter. It's also worthwhile to indicate that it is "signal lights" that are being controlled.

As corrected:

WINCUPL was used to compile the Boolean Equations for the sequential machine state variables which determine when each of the six signal lights is on and off.

Example 10:

However, when the design was tested the circuit was unable to properly.

Can you read this and think it is a good sentence? Does something seem missing? Often just rereading one'

S work before submitting it will catch obvious errors like this one. Clearly the verb that needs to follow "to properly" is missing. It seems to need "operate" or "function". Again, a required comma is missing.

As corrected:

However, when the design was tested, the circuit was unable to properly function.

Example 11:

The design did not work as desired and only output red lights, this may be because the sequential logic caused the machine to become stuck in an undefined state where an output is sitting in an arbitrary zone and because the red light outputs are being driven by a 74ls32 they are the only outputs that are received as a one.

This is another run-on sentence. Too many different thoughts are merged into a confusing stream of consciousness, like a bad dream. So, the first step is to break it up into separate sentences. Only then can we try to make sense of each one.

Intermediate step:

The design did not work as desired and only output red lights. This may be because the sequential logic caused the machine to become stuck in an undefined state. An undefined state is where an output is sitting in an arbitrary zone. Because the red light outputs are being driven by a 74ls32, they are the only outputs that are received as a one.

Correct wording concerning outputs is tricky. The word "outputted" seems to awkward and informal, and should be avoided. How about, "**The design did not work as desired, and only would output active on red lights.**" (Notice the needed comma, as in so many other examples.)

The next sentence seems OK: "**This may be because the sequential logic caused the machine to become stuck in an undefined state.**" The reader may wonder what an "undefined state is, but that question is immediately answered.

The next component sentence isn't technically correct, although the English usage is fine. **An undefined state is where the machine enters a state that it should never enter, due to a logical design error or an electronics problem such as noise.**

The last sentence fragment isn't understandable without reference to material earlier than this sentence. My modification to try and account for this is rather speculative. One usage issue

is that the LSTTL devices should have capitalized letters. “LS” not “ls”. As usual, there is a punctuation error; a semicolon connects a compound sentence with no conjunction. **Because the red light outputs are being driven by a 74LS32, and the controlling inputs are all ones; they are the only outputs that are displayed as a ones, and hence on.**

As corrected:

“The design did not work as desired, and only would output active on red lights. This may be because the sequential logic caused the machine to become stuck in an undefined state. An undefined state is where the machine enters a state that it should never enter, due to a logical design error or an electronics problem such as noise. Because the red light outputs are being driven by a 74ls32, and the controlling inputs are all ones; they are the only outputs that are displayed ones, and hence on.