Specialist English: Assignment 2 (solutions)

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Here's my solutions; your solutions needn't be identical. There may be problems with the sample snippets I haven't listed.

Problem 1

- So-called "Equation (1)" is not an equation; it's an inequality. The second sentence should begin "Inequality (1) ...".

  Other points:

  - Wikipedia says it's an "inequation", but I don't think this is an actual word. If it is actually a word, it's so rarely used that it would be confusing to use it.
  - I didn't ask for the sentence to be rewritten.
  - I didn't ask for the mathematical claim to be extended (we might not need a generalization in whatever paper it belongs to).

- It's unclear: what does it mean to "improve" the run time by "a factor of 55%"?

  - The word "factor" implies multiplication, so if the original run time is r, then the run time is improved by $55\%\, r = 0.55r$. Does this mean the "improved" run time is $0.55r$ or $r - 0.55r = 0.45r$? Or does it mean something else?
    - It's so unclear, students interpreted this sentence in about four different ways.
  - The wording "... improve X by a factor of ..." suggests that the performance of something is increasing. However, improving performance in terms of "run time" means decreasing it—the wording feels unnatural.

  Other points:

  - Fixing this sentence requires knowledge of the underlying meaning. We can guess, but we can't be sure—it's best to ask the author to fix it.

Problem 2

Kronecker delta function: In mathematics, the Kronecker delta function is a function of two variables, usually just positive integers. The function is 1 if the variables are equal, and 0 otherwise:

$$\delta_{x,y} = \begin{cases} 1, & x = y \\ 0, & x \neq y \end{cases} \tag{1}$$

Problems:

1. This is copy/pasted from Wikipedia—this is plagiarism. (I didn't realize this when I wrote the assignment.) **This is the most important thing wrong with this snippet**.
2. The Kronecker delta function is defined twice!!

3. "In mathematics, ..." is unnecessary (and misleading, since it implies it's not true outside of mathematics).
4. Repetition: It says "Kronecker delta function" twice. It also says "function" four times.
5. We don't need a whole paragraph to define a simple function like the Kronecker delta function; one sentence is enough.
6. Writing "... two variables, usually just positive integers" implies "variables" and "positive integers" are the same thing.
7. "The function is 1 ..." strictly speaking should be "The function evaluates to 1 ...". However, writing this would be too wordy; it's more succinct to use mathematical notation instead.
8. There's no full stop at the end of the sentence.
9. There's better separation between mathematical expressions if we write "if $x = y$," then "if $x \neq y$" (or "otherwise").
10. Equation (1) is not referenced in the paper; we should omit the label.
11. The snippet does not directly imply that $\delta_{x,y}$ denotes the Kronecker delta function.

Other points

- Giving a function's domain is ordinarily beneficial, but writing "usually just positive integers" is vague. What's important is *how is it used in the present paper?* We might write "The Kronecker delta function $\delta_{x,y} \colon \mathbb{Z}^+ \to \mathbb{Z}^+$ ...". In this particular example, I think this is going overboard; the implicit domain is the set of whatever we use $\delta_{x,y}$ for in the paper.
- While both $\delta_{x,y}$ and δ_{xy} (without the comma) are formally acceptable, I wouldn't make this change because:
  - It might problems at other points in the paper. E.g. does δ_{2ab} mean $\delta_{(2a)b}$ or $\delta_{2(ab)}$.
  - We'd have to edit it throughout the entire paper (not just this snippet) to ensure the notation is consistent. This is too much effort for very little gain, and may introduce bugs.
- Some students renamed "Kronecker delta function" to "Kronecker delta"; it's debatable if this is advantageous.

This can be made more succinct by:

> The Kronecker delta function $\delta_{x,y}$ is defined by
>
> $$\delta_{x,y} = \begin{cases} 1, & \text{if } x = y, \\ 0, & \text{if } x \neq y. \end{cases}$$

Or we could write:

> The Kronecker delta function $\delta_{x,y}$ is defined such that $\delta_{x,y} = 1$ if $x = y$, and $\delta_{x,y} = 0$ if $x \neq y$.

Problem 3

Table 1 shows the list of symbols used in the model.

$$\gamma_t = \gamma_{un} + \gamma_{deg} \tag{1}$$

$$\lambda_{un} = 1 - \frac{\alpha}{100} \tag{2}$$

$$\gamma_{un} = (\lambda_{un} * \Psi_{p_i}) - \frac{\beta}{\alpha} \tag{3}$$

In eq. 1, γ_t represents the total amount to be refunded. γ_{un} is the reimbursement amount of unutilized resources. γ_{deg} is the degradation factor to be paid on SLA violation.

Problems (LaTeX typesetting):

1. In place of "eq. 1", we should simply write "(1)" to match its tag.
2. In "eq. 1", the period is (mis)interpreted by LaTeX as the end of a sentence. If we were going to write this, we should typeset it `eq.~1` to avoid this problem.
3. It would look better if the equations were aligned at the equals sign.
4. The equations would flow better if reordered based on their dependencies: (1) then (3) then (2).
5. The indent indicates a new paragraph, implying that variables such as γ_t are not defined until the next paragraph.
6. Equations (2) and (3) are not referenced in the paper, so we shouldn't use equation labels; in LaTeX this can be achieved using `\nonumber`.

Problems (presentation of mathematics):

1. The variables should be written γ_{un} and γ_{deg}, etc., typeset `$\gamma_{\text{un}}$` or `$\gamma_{\mathrm{un}}$`, etc., and not e.g. γ_{un} which might be misinterpreted as $\gamma_{u \times n}$.
2. The asterisk * is not a multiplication symbol; we can change it to $\times$ or $\cdot$, but it's simplest to write $\gamma_{\text{un}} \Psi_{p_i}$.
3. The brackets in "$(\lambda_{un} * \Psi_{p_i})$" are redundant. Moreover, since the reader does not expect redundant brackets, they may (mis)interpret this as having some hidden meaning.

   The reader's logic might follow:

   (a) If the brackets were not necessary, the author wouldn't have written them.

   (b) The author wrote brackets.

   (c) Therefore, the brackets are necessary, so I can expect them to have some technical meaning.

Problems (mathematics is used within sentences):

1. In writing "In eq. 1, γ_t ...", we have two mathematical expressions separated by a comma.
2. We twice start a sentence with mathematics.
3. The equations (1) to (3) are just floating; they are not part of sentences.
4. Equations (1) to (3) are stated completely without context; these equations that come out of nowhere!
5. Equations (1) to (3) use variables which are not defined until after the reader has read the "sentences" containing the equations. Consequently, the reader may assume that these variables were defined previously, and search for their definitions.

Other points:

- Some students suggested writing $a/100$ and β/α. This is appropriate for inline equations, but it's not an improvement for displayed equations.
- Some students commented that "Table 1 shows the list of symbols ..." is inaccurate, in that Table 1 is a list of definitions. This is a fair point, which I didn't notice myself.
  - I would also add that it's more accurate to say "variables" instead of "symbols". We don't define a symbol, we define what it represents.
- I included the first sentence to show how the previous sentence ended. The whole paragraph it belongs to is too long to include.
- Some students pointed out the mismatch in adding together something described as an "amount" and something described as a "factor". This is a good point; it goes against Strunk & White's guideline: "express co-ordinate ideas in similar form". (See the Specialist English: Resources lecture notes.)

  However, it's possible the term "degradation factor" has been established in previous papers. In this case, we might be forced to use it despite the mismatch.