Engineering Journal (Log) – Guide

This Engineering Journal is **NOT about after-thought documentation** of your work; it is a **DATED LOG to show your progress,** starting right from the design to deployment.

Engineering, including hardware and software development, is a cyclic process. However, there MUST BE a good level of design work/ project planning before any level of implementation is done. Prototyping in software and hardware steps is also a part of the design stages. Good record keeping serves as an excellent tool for:

- Reference for future issues or clear reference for yourself and others.
- Allowing you and others to verify your work.
- Reproduce design accomplishments or confirm test results
- Reflect new ideas, challenges, and solutions.

The Value

The ability to produce informative engineering log is an indispensable skill in research discipline; especially if you someday wish to be an inventor. You will need to apply for patents based on your inventions with proof to substantiate your qualifications. Such discipline is highly valued but, unfortunately, vastly neglected. Such quality is a rare commodity in engineering.

An informative journal is essential in any engineering and research work, especially when it is a teamwork. When you work as a team member, it's your responsibility to maintain an engineering journal.

RoboCupJunior ***heavily*** stresses ***education*** over the competition. Competition is just a vehicle to achieve its primary goal – educate pre-college students by fostering Artificial Intelligence (AI) and robotics research. Thus, an informative log should be a requirement of all engineering work.

Engineers are often unable to reproduce design accomplishments or confirm test results due to inadequate record-keeping.

Dos and Don'ts

Do's	**Don'ts**
● Be concise. You are not going to write an essay. No long paragraph. ● Bullet-point your SUMMARIZED ideas to keep ideas organized. ● Sometimes, keywords may be sufficient. ● Try to summarize each points in less than 20 words – for easy lookup. ● Diagrams, Sketches of your designs, etc.	**It's NOT a document done as an afterthought.** No long paragraph. You are not writing essays.

Don't know what to put in the journal?

If you wonder what should go in the journal, ask yourself these questions:

- What information do I need to write here in order for me and others to be able to at least somewhat reproduce and verify my work?
- Will the information be good enough for me and others to reference if the same issues arise much later down the road?

Some samples of good vs useless information:

POOR (not helpful):	**GOOD :**
Planning today	Go here to see the plan. (i.e., hyperlink to your design plan).
Started my code	Create the high level framework for : ● Navigation portion (just prototypes) ● Abstracted APIs (just prototypes) ● The simulation text map (just prototypes) ● GitHub
Finish up navigation portion today	Complete B.F.S. backtracking. Have tested with a 10×10 map. See the map. (i.e., hyperlink to the map image). Still need more sample maps to test.
A lot of issues today. Finally fix of them.	Can't get around the 90-degree turn. Can't quite see the S-victim if it is sideways. Encoder math doesn't work… - *show your calculation even if it is not working* - draft math work is fine too. **Remember: this is a log, NOT a formal document.**

What goes in your engineering journal

One simple Bio page: (only if this is a team)

- You can do this anytime, as timeline does not apply.
- Your team bio.
- Introduce the operational logistics, such as forum for communication, meetings frequency, location(s), etc.

What should be in the daily log:

1. **DATE & NAME**
   a. The work day when the work takes place
   b. The one who write this page of log

2. **Tasks done today**
   a. may be formulated at different levels of abstraction ranging from high-level, strategic concerns, etc.
   b. tests…
   c. be concise. It is less likely you or your teammate will review the written information, if it is a long-wounded paragraph.

3. **Issues and solutions**

Sample table (add/modify columns and rows as needed):

	Issues	Solutions, if any
Hardware		
Software		

Reminder This can be extremely helpful to record an anomaly, and remind and mark caution.

4. **New Ideas | Thoughts: (if any)**
   a. Any design work (this is particularly important before any level of implementation)
   b. Any new findings, ideas, any follow up, etc.
   c. Remain concise

example: **Collection of design concepts:(if any)**
   a. CAD if it is hardware. It does not need to be professional quality, but just legible enough for you or others in the team to reference in the future.
   b. redesigns, plans, and schematics
   c. flowchart or UML, if applicable
   d. ideas, calculations, innovations, and test results

5. **Figures/Drawings/Tables (this is particularly valuable)**
   a. Use numbered labels for figures (i.e., graphs and illustrations) and tables, so you can refer to them more easily within the text
   b. It’s best to place figures and tables where they are referenced in the text
   c. Numbered labels should be placed underneath figures but above tables
   d. A caption should appear underneath figures and tables
   e. Try not to use such phrases as “In the table below…”. Instead, say “In Table 1, it can be seen that…”. It is desirable to have the reference to the figure and the figure itself on the same page. If that can’t be done, the illustration should be on the immediate next page
   f. Titling a figure as “Fig. 1” is insufficient. It must have a descriptive title such as: “Fig. 1 System Block Flowchart for…”

6. **Research (if applicable)**

Should include all the reference to investigation work that you use or spark your ideas, if any