This book describes the features of our documentation system and the procedures to update it.
PART A

Contributing to the documentation

This part describes the workflow for contributing to our documentation.

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UNIT A-1

Overview

1.1. Where the documentation is
The documentation is contained in a series of repositories called docs- short name:
For example:
- docs-duckumentation (this book)
- docs-AIDO

1.2. Documentation format
The documentation is written as a series of small files in Markdown format.
It is then processed by a series of scripts to create publication-quality PDF and an online HTML version.
You can find all these artifacts produced at the site https://docs.duckietown.org.
The simplest way to contribute to the documentation is to click any of the “✎” icons next to the headers, in the book itself.

Figure 2.1. Click on edit button.
They link to the “edit” page in Github. There, one can make and commit the edits in only a few seconds.

Figure 2.2. You will land on GitHub
Do your edits where appropriate.

Figure 2.3. Editing the docs.
You can check the outcome by clicking on Preview changes, note that not all functionalities are visible by the preview. For large changes refer to Unit A-3 - Second method:
local editing+docker.

Figure 2.4. A preview of the changes.

Then after your edits, in the bottom part of the webpage, describe your commit and click on Propose file change. When committing, please choose “create branch”.

Figure 2.5. Describe and commit.

Then, click on Create pull request, as you probably don’t have rights to push directly.

Figure 2.6. Create a pull request.

Again you need to confirm that you want to open the pull request.
Open a pull request

Create a new pull request by comparing changes across two branches. If you need to, you can also compare across tags.

Figure 2.7. Confirm a pull request.
This section describes the workflow to edit the documentation for one single book.

In a nutshell:

- You fork the repos to your Github account.
- You compile locally using a Docker container (no installation necessary).
- You contribute by opening a pull request.

## 3.1. Workflow

1) Github setup

We assume that you have setup a Github account with working public keys.

- Basic SSH config.
- Key pair creation.
- Adding public key on Github.

2) Install Docker

Before you start, make sure that you have installed Docker.

3) Install the Duckietown Shell

Install the Duckietown Shell using these instructions.

4) Fork the docs-book repo on the Github site

Fork one of the docs-book repos on the Github site (Figure 3.1).

This will create a new repo on your account that is linked to the original one.

5) Checkout your fork locally
Check out the forked repository as you would do normally.

6) Initialize your folder

Go into the folder:

```
$ cd docs/book
```

When compiling a book for the first time, you need to run:

```
$ git submodule init
```

And:

```
$ git submodule update
```

7) Do your edits

Do your edits on your local copy. The source files are in the directory `book/book`. The file and folder names start with numbers, these are used to determine the order that things show up in output.

8) Compile

Compile using the `docs` commands in the Duckietown Shell:

```
$ dts docs build
```

Re-compile from scratch using:

```
$ dts docs clean
$ dts docs build
```

If there are errors you should open `duckuments-dist/errors.html` and look at them and fix them.

9) Look at the local copy

Open the file `index.html` and navigate to whichever pages you have changed to make sure that they look the way want them to.

10) Commit and push

Commit and push as you would do normally.

11) Make a pull request

Create a pull request to the original repository.
Option 1: Use the Github website:
Github offers a nice interface to create a pull request.

Option 2: Use the command-line program `hub`:
You can create a pull request from the command-line using `hub`:

```
$ hub pull-request
```

3.2. Using CircleCI
Circle CI makes it easier to check whether there are problems to be fixed.

1) Sign up on Circle
Sign up on the Circle CI service, at the link circleci.com.

2) Activate your build on Circle
Activate the building at the link:

```
https://circleci.com/setup-project/gh/ username /duckuments
```

where `username` is your Github username.
Click “start building”.

Make sure everything compiles on Circle:
Go to the URL:

```
https://circleci.com/gh/ username /duckuments
```

to see the status of your build.
You can also preview the results by clicking the “artifacts” tab and selecting `index.html` from the list.
SECOND METHOD: LOCAL EDITING+DOCKER

Figure 3.2
UNIT A-4
Troubleshooting for Duckumentation

4.1. Markduck problems
First, see the section Unit B-5 - Troubleshooting for common problems and their resolu-
tion.
Please report problems with the duckuments using the duckuments issue tracker.
Special notes:
• If you have a problem with a generated PDF, please attach the offending PDF.
• If you say something like “This happens for Figure 3”, then it is hard to know which
figure you are referencing exactly, because numbering changes from commit to com-
mit.
If you want to refer to specific parts of the text, please commit all your work on your
branch, and obtain the name of the commit using the following commands:

$ git rev-parse HEAD

4.2. Problem: The building hangs

1) Cause: insufficient memory
This might be due to insufficient memory.
For example, on Mac, the default setting is 2GB of RAM. Try increasing it (Figure 4.1).
A workaround is to stop and restart the process (but without doing `dts docs clean`).

2) **Cause: downloading in the background**

Sometimes the problem is that the code is downloading something in the background, for example a Git repository.

Currently this is hard to debug.
We suggest the following:

- Find a visual Markdown editor that you like.
- Complement with a superb text-only editor.

5.1. Graphical Markdown editors

1) Typhora

Typhora is our favorite because it allows to preview LaTeX formulas.

5.2. Text editors good for Markdown

5.3. Atom

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5.4. PyCharm

   - Unit B-4 - PyCharm
PART B

Markduck format

This part describes the Markdown dialect that is used in the documentation.

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UNIT B-1

Basic Markduck guide

The Duckiebooks are written in Markduck, a Markdown dialect. It supports many features that make it possible to create publication-worthy materials.

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1.1. Markdown

The Duckiebooks are written in a Markdown dialect.

→ A tutorial on Markdown.

1.2. Variables in command lines and command output

Use the syntax “! [name] ” for describing the variables in the code.

example

For example, to obtain:

```
$ ssh [robot name].local
```

Use the following:

```
For example, to obtain:
$ ssh ! [robot name].local
```

Make sure to quote (with 4 spaces) all command lines. Otherwise, the dollar symbol confuses the LaTeX interpreter.
1.3. **Character escapes**

Use the string “&\#36;” to write the dollar symbol “$”, otherwise it gets confused with LaTeX math materials. Also notice that you should probably use “USD” to refer to U.S. dollars.

Other symbols to escape are shown in Table 1.1.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>escaped symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>$</td>
<td>use &amp;#36;</td>
</tr>
<tr>
<td>`</td>
<td>use &amp;#96;</td>
</tr>
<tr>
<td>&lt;</td>
<td>use &lt;</td>
</tr>
<tr>
<td>&gt;</td>
<td>use &gt;</td>
</tr>
</tbody>
</table>

1.4. **Keyboard keys**

Use the `kbd` element for keystrokes.

**example**

For example, to obtain:

```
Press a then Ctrl-C.
```

use the following:

```
Press <kbd>a</kbd> then <kbd>Ctrl</kbd>-<kbd>C</kbd>.
```

1.5. **Figures**

To create a figure, use the element `figure`:

```html
<figure>
  <figcaption>Hello</figcaption>
  <img style='width:8em' src="duckietown-logo-transparent.png"/>
</figure>
```

Figure 1.1. Hello

1) **More attributes**

Use class="caption-left" to have the caption show up on the left rather than on the bottom:
1.6. Subfigures

You can create subfigures by nesting *figure* elements:

```
<figure>
  <figcaption>Main caption</figcaption>
  <figure>
    <figcaption>Hello</figcaption>
    <img style='width:8em' src="duckietown-logo-transparent.png"/>
  </figure>
  <figure>
    <figcaption>second</figcaption>
    <img style='width:8em' src="duckietown-logo-transparent.png"/>
  </figure>
</figure>
```

Figure 1.3. Main caption

By default, they are displayed one per block. To make them flow horizontally, add
For any element, adding an attribute called `figure-id` with value `fig: figure ID` or `tab: table ID` will create a figure that wraps the element.

### 1.7. Shortcut for tables

The shortcuts `col2`, `col3`, `col4`, `col5` are expanded in tables with 2, 3, 4 or 5 columns. The following code:

```html
<col2 figure-id="tab:mytable" figure-caption="My table">
  <span>A</span>
  <span>B</span>
  <span>C</span>
  <span>D</span>
</col2>
```

gives the following result:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>C</td>
<td>D</td>
</tr>
</tbody>
</table>

**Table 1.2. My table**

1) **labels-row1 and labels-row1**

Use the classes `labels-row1` and `labels-row1` to make pretty tables like the following. `labels-row1`: the first row is the headers.
labels-col1: the first column is the headers.

### Table 1.3. Using class="labels-col1"

<table>
<thead>
<tr>
<th>header A</th>
<th>B</th>
<th>C</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>header D</td>
<td>E</td>
<td>F</td>
<td>2</td>
</tr>
<tr>
<td>header G</td>
<td>H</td>
<td>I</td>
<td>3</td>
</tr>
</tbody>
</table>

### Table 1.4. Using class="labels-row1"

<table>
<thead>
<tr>
<th>header A</th>
<th>header B</th>
<th>header C</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>G</td>
<td>H</td>
<td>I</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

1.8. **Linking to documentation**

1) **Establishing names of headers**

You give IDs to headers using the format:

```markdown
### header title {#topic ID}
```

For example, for this subsection, we have used:

```markdown
### Establishing names of headers {#establishing}
```

With this, we have given this header the ID “establishing”.

2) **How to name IDs - and why it’s not automated**

Some time ago, if there was a section called

```markdown
## My section
```

then it would be assigned the ID “my-section”.

This behavior has been removed, for several reasons.

One is that if you don’t see the ID then you will be tempted to just change the name:

```markdown
## My better section
```

and silently the ID will be changed to “my-better-section” and all the previous links will be invalidated.

The current behavior is to generate an ugly link like “autoid-209u31j”.

This will make it clear that you cannot link using the PURL if you don’t assign an ID.

Also, I would like to clarify that all IDs are *global* (so it’s easy to link stuff, without
thinking about namespaces, etc.). Therefore, please choose descriptive IDs, with at least two IDs. E.g. if you make a section called

```markdown
## Localization {#localization}
```

that’s certainly a no-no, because “localization” is too generic.

✔

```markdown
## Localization {#intro-localization}
```

Also note that you don’t need to add IDs to everything, only the things that people could link to. (e.g. not subsubsections)

3) **Linking from the documentation to the documentation**

You can use the syntax:

```markdown
[](# topic ID )
```

to refer to the header.

You can also use some slightly more complex syntax that also allows to link to only the name, only the number or both (Table 1.5).

**Table 1.5. Syntax for referring to sections.**

See `[](#establishing)`.  
See Subsection 1.8.1 - Establishing names of headers

See `<a class="only_name" href="#establishing">`  
See Establishing names of headers.

See `<a class="only_number" href="#establishing">`  
See 1.8.1.

See `<a class="number_name" href="#establishing">`  
See Subsection 1.8.1 - Establishing names of headers.

### 1.9. Comments

You can insert comments using the HTML syntax for comments: any text between
“<!-” and “-->” is ignored.

# My section

<!-- this text is ignored -->

Let's start by...
2.1. Special paragraphs tags
The system supports parsing of some special paragraphs.

1) Special paragraphs must be separated by a line
A special paragraph is marked by a special prefix. The list of special prefixes is given in the next section.
There must be an empty line before a special paragraph; this is because in Markdown a paragraph starts only after an empty line.
This is checked automatically, and the compilation will abort if the mistake is found.
For example, this is invalid:

```
See: this book
See: this other book
```

This is correct:

```
See: this book
See: this other book
```

Similarly, this is invalid:

```
Author: author
Maintainer: maintainer
```

and this is correct:

```
Author: author
Maintainer: maintainer
```

2) Todos, task markers

```
TODO: todo  TOWRITE: towrite
```
To write: to write

Task: task

Assigned: assigned
Assigned to: assigned

3) Notes and remarks

Remark: remark
Remark: remark

Note: note
Note: note

Warning: warning
Warning: warning

4) Troubleshooting

Symptom: symptom
Symptom: symptom

Resolution: resolution
Resolution: resolution

5) Guidelines

Bad: bad
× bad

Better: better
better

6) Questions and answers

Q: question

Answer: answer

7) Authors, maintainers, Point of Contact

Maintainer: maintainer

Assigned: AndreaCensi

8) References

See: see

- see

Reference: reference

- reference

Requires: requires

Requires: requires

Results: results

Results: results
2.2. Other div environments

For these, note the rules:

- You must include `markdown="1"`.
- There must be an empty line after the first `div` and before the closing `/div`.

1) Example usage

```html
<div class='example-usage' markdown="1">
This is how you can use `rosbag`:

```bash
$ rosbag play log.bag
```

</div>
```

2) Check

```html
<div class='check' markdown="1">
Check that you didn't forget anything.

</div>
```
Check that you didn’t forget anything.

3) Requirements

List of requirements at the beginning of setup chapter.

2.3. Notes and questions

There are three environments: “comment”, “question”, “doubt”, that result in boxes that can be expanded by the user.

These are the one-paragraph forms:

- **Comment**: this is a comment on one paragraph.
  
  comment
  
  this is a comment on one paragraph.

- **Question**: this is a question on one paragraph.
  
  question
  
  this is a question on one paragraph.

- **Doubt**: I have my doubts on one paragraph.
  
  doubt
  
  I have my doubts on one paragraph.

These are the multiple-paragraphs forms:

- A comment...
  
  A second paragraph...

A comment...

A second paragraph...
A question...
A second paragraph...

A question...
Should it not be:

$ alternative command

A second paragraph...

A question...
Should it not be:

$ alternative command

A second paragraph...
UNIT B-3
Using LaTeX constructs in documentation

KNOWLEDGE AND ACTIVITY GRAPH

Requires: Working knowledge of LaTeX.

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3.1. Embedded LaTeX
You can use \texttt{\LaTeX} math, environment, and references. For example, take a look at

\[ x^2 = \int_0^t f(\tau) \, d\tau \]
or refer to Proposition 1 - Proposition example.

**Proposition 1.** (Proposition example) This is an example proposition: \(2x = x + x\).

The above was written as in Listing 3.1.

You can use $\LaTeX$ math, environment, and references. For example, take a look at

\[
x^2 = \int_0^t f(\tau) \text{d}\tau
\]

or refer to [](#prop:example).

\begin{proposition}[Proposition example]\label{prop:example}
This is an example proposition: $2x = x + x$.
\end{proposition}

Listing 3.1. Use of LaTeX code.

For the LaTeX environments to work properly you must add a \label{} declaration inside. Moreover, the label must have a prefix that is adequate to the environment. For example, for a proposition, you must insert \label{prop: name} inside.

The following table shows the list of the LaTeX environments supported and the label prefix that they need.

<table>
<thead>
<tr>
<th>Table 3.1. LaTeX environments and label prefixes</th>
</tr>
</thead>
<tbody>
<tr>
<td>definition</td>
</tr>
<tr>
<td>proposition</td>
</tr>
<tr>
<td>remark</td>
</tr>
<tr>
<td>problem</td>
</tr>
<tr>
<td>theorem</td>
</tr>
<tr>
<td>lemma</td>
</tr>
</tbody>
</table>

Examples of all environments follow.

\begin{definition}[My definition]\label{def:lorem}
Lorem
\end{definition}

**Definition 1.** (My definition) Lorem

\begin{proposition}[My proposition]\label{prop:lorem}
Lorem
\end{proposition}

**Proposition 2.** (My proposition) Lorem
Remark 1. (My remark) Lorem

Problem 1. (My problem) Lorem

Example 1. (My example) Lorem

Theorem 1. (My theorem) Lorem

I can also refer to all of them: Definition 1 - My definition, Proposition 2 - My proposition, Remark 1 - My remark, Problem 1 - My problem, Example 1 - My example, Theorem 1 - My theorem, Lemma 1 - My lemma.

3.2. \LaTeX{} equations
We can refer to equations, such as (1):
2a = a + a  \label{eq:one}  \tag{1}

This uses `align` and contains \eqref{eq:two} and \eqref{eq:three}.

\begin{align}
a &= b  \label{eq:two} \\
&= c \label{eq:three}
\end{align}  \tag{2} \tag{3}

We can refer to equations, such as \eqref{eq:one}:

\begin{equation}
2a = a + a \label{eq:one}
\end{equation}

This uses `align` and contains \eqref{eq:two} and \eqref{eq:three}.

\begin{align}
a &= b \label{eq:two} \\
&= c \label{eq:three}
\end{align}

Note that referring to the equations is done using the syntax \eqref{eq: name}, rather than \[(#eq: name)\].

### 3.3. LaTeX symbols

You can place any LaTeX symbols definition in files called `*.symbols.tex`. These will be included as preamble.

For example, this repository contains a file `a.symbols.tex` containing:

\newcommand{\mysymbol}{\text{This is defined in a.symbols.tex}}

So then when we create an equation with:

$$ \mysymbol $$

It gets rendered as:

This is defined in a.symbols.tex

### 3.4. Bibliography support

You need to have installed `bibtex2html`.

The system supports BibTex files.

Place `*.bib` files anywhere in the directory.

Then you can refer to them using the syntax:
For example:

Please see [(#bib:siciliano07handbook)].

Will result in:

Please see [1].

3.5. Embedding Latex in Figures through SVG

**KNOWLEDGE AND ACTIVITY GRAPH**

| Requires: | In order to compile the figures into PDFs you need to have Inkscape installed. Instructions to download and install Inkscape are here. |

To embed latex in your figures, you can add it directly to a file and save it as *filename*.svg file and save in the /docs directory in a subfolder called assets/svg2pdf. You can then run:

```
$ make process-svg-figs
```

And the SVG file will be compiled into a PDF figure with the LaTeX commands properly interpreted.

You can then include the PDF file in a normal way (Section 1.5 - Figures) using *filename*.pdf as the filename in the `<img>` tag.

Figure 3.1. Embedding LaTeX in images

It can take a bit of work to get the positioning of the code to appear properly on the figure.

3.6. Using the HTML equivalent of Latex environments

Contents
You can create an exercise as follows:

```html
<div id="exercise:my-exercise" class="exercise" title="Exercise title">
    This is an exercise labeled "exercise:my-exercise".
</div>

<%div class="exercise" title="Second exercise">
    This is an exercise not labeled.
</%div>

Referring to the exercise: [](#exercise:my-exercise) or [](#my-exercise).

| Exercise 1. This is an exercise labeled "exercise:my-exercise". |
| Exercise 2. This is an exercise not labeled. |

Referring to the exercise: Exercise 1 - Exercise title or Exercise 1 - Exercise title.

3.7. Alternative style

If you have block content element (e.g. code blocks), you must use headers as html cannot contain block-level Markdown.

You must use something like the following. The marker `end` tells the system to stop the level 4 section.
Another exercise

This is another exercise with block content:

```bash
$ echo hello
```

This is part of the level 2 section.
Another exercise starts for the rest of the section.

Another exercise

After the second exercise.

---

Exercise 3. Another exercise.
This is another exercise with block content:

```bash
$ echo hello
```

This is part of the level 2 section.
Another exercise starts for the rest of the section.

Exercise 4. Another exercise.

After the second exercise.
UNIT B-4
Embedding videos

It is possible to embed Vimeo videos in the documentation.

**Note:** Do not upload the videos to your personal Vimeo account; they must all be posted to the Duckietown Engineering account.

This is the syntax:

```html
<dtvideo src="vimeo:vimeo ID"/>
```

**Example**

For example, this code:

```html
<figure id="example-embed">
   <figcaption>Cool Duckietown by night</figcaption>
   <dtvideo src="vimeo:152825632"/>
</figure>
```

produces this result:

![Duckietown](example-embed)

Figure 4.1. Cool Duckietown by night

Depending on the output media, the result will change:

- On the online book, the result is that a player is embedded.
- On the e-book version, the result is that a thumbnail is produced, with a link to the video;
- (future improvement) On the dead-tree version, a thumbnail is produced with a QR code linking to the video.
UNIT B-5
Troubleshooting

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5.1. Troubleshooting errors in the compilation process

**Symptom:** “Invalid XML”

**Resolution:** “Markdown” doesn’t mean that you can put anything in a file. Except for the code blocks, it must be valid XML. For example, if you use “>” and “<” without quoting, it will likely cause a compile error.

**Symptom:** “Tabs are evil”

**Resolution:** Do not use tab characters. The error message in this case is quite helpful in telling you exactly where the tabs are.

**Symptom:** The error message contains `ValueError: Suspicious math fragment 'KEYMATHS000ENDKEY'

**Resolution:** You probably have forgotten to indent a command line by at least 4 spaces. The dollar in the command line is now being confused for a math formula.

5.2. Not properly starting a list

There must be an empty line before the list starts.

This is correct:

```
I want to learn:
- robotics
- computer vision
- underwater basket weaving
```

This is incorrect:

```
I want to learn:
- robotics
- computer vision
- underwater basket weaving
```

and it will be rendered as follows:
I want to learn: - robotics - computer vision - underwater basket weaving

5.3. Forgetting markdown=1
If you forget markdown=1 the contents of the tag will not be processed.
For example, this:

```html
<div class="exercise" title="My exercise title">

Open a new terminal and navigate to `~/.ssh` and open the file named `config`.

</div>
```

results in:

| Exercise 5. Open a new terminal and navigate to `~/.ssh` and open the file named `config`. |

5.4. Code inside html

| Exercise 6. Here is a code block: $ code block Another block: `python` or `tAny` After block: code block |
PART C
Documentation style guide

This part describes the style guide for our documentation.

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UNIT C-1

Style guide

This chapter describes the conventions for writing the technical documentation.

1.1. Organization
The documentation is divided into books, parts (labeled ‘part:’) and units (with no CSS prefix).

To create a new part, put `{#part:name status=STATUS}` after the header, like so:

``````
## Safety `{#part:safety status=ready}
``````

1.2. General guidelines for technical writing
The following holds for all technical writing.

- The documentation is written in correct English.
- Do not say “should” when you mean “must”. “Must” and “should” have precise meanings and they are not interchangeable. These meanings are explained in this document.
- “Please” is unnecessary in technical documentation.
  - “Please remove the SD card.”
  - “Remove the SD card”.
- Do not use colloquialisms or abbreviations.
  - Bad: “The pwd is ubuntu.”
  - Better: “The password is ubuntu.”
  - “To create a ROS pkg...”
  - “To create a ROS package...”
- Python is capitalized when used as a name.
  - “If you are using python...”
  - “If you are using Python...”
- Do not use emojis.
- Do not use ALL CAPS.
- Make infrequent use of **bold statements**.
- Do not use exclamation points.

1.3. Style guide for the Duckietown documentation

- The English version of the documentation is written in American English. Please
note that your spell checker might be set to British English.

- behavior
- behavior
- localisation
- localization

- It’s ok to use “it’s” instead of “it is”, “can’t” instead of “cannot”, etc.
- All the filenames and commands must be enclosed in code blocks using Markdown backticks.

- “Edit the ~/.ssh/config file using vi.”
- “Edit the ~/.ssh/config file using vi.”

- Ctrl-C, ssh etc. are not verbs.
  - “Ctrl-C from the command line”.
  - “Use Ctrl-C from the command line”.
- Subtle humor and puns about duckies are encouraged.

1.4. Writing command lines

Use either “laptop” or “duckiebot” (not capitalized, as a hostname) as the prefix for the command line.

For example, for a command that is supposed to run on the laptop, use:

```
laptop $ cd ~/duckietown
```

It will become:

```
$ cd ~/duckietown
```

For a command that must run on the Duckiebot, use:

```
duckiebot $ cd ~/duckietown
```

It will become:

```
$ cd ~/duckietown
```

If the command is supposed to be run on both, omit the hostname:

```
$ cd ~/duckietown
```

Other rules:

- For a container use container.
- For a container on a Duckiebot use duckiebot-container.
• For a container on the laptop use `laptop-container`. This:

```
container $ command
```

will become:

```
$ command
```

This:

```
duckiebot-container $ command
```

will become:

```
$ command
```

This:

```
laptop-container $ command
```

will become:

```
$ command
```

### 1.5. Frequently misspelled words

- “Duckiebot” is always capitalized.
- Use “Raspberry Pi”, not “PI”, “raspi”, etc.
- These are other words frequently misspelled: 5 GHz WiFi

### 1.6. Other conventions

When the user must edit a file, just say: “edit `/this/file`”.

Writing down the command line for editing, like the following:

```
$ vi /this/file
```

is too much detail.

(If people need to be told how to edit a file, Duckietown is too advanced for them.)

### 1.7. Troubleshooting sections

Write the documentation as if every step succeeds.

Then, at the end, make a “Troubleshooting” section.
Organize the troubleshooting section as a list of symptom/resolution. The following is an example of a troubleshooting section.

1) Troubleshooting

- **Symptom:** This strange thing happens. 
  **Resolution:** Maybe the camera is not inserted correctly. Remove and reconnect.

- **Symptom:** This other strange thing happens. 
  **Resolution:** Maybe the plumbus is not working correctly. Try reformatting the plumbus.
PART D
Slides

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Creating slides

See this presentation: ? Making slides
Making slides

To create slides, use `type=slides` for an H1 header:

```markdown
# Making slides {#making-slides type=slides status=ready nonumber=1}

To create slides, use the attribute `type=slides` for an H1 header:
```

1.1. Next slides

Use second-level headers to make subsequent slides:

```markdown
# Making slides {#making-slides type=slides status=ready}

To create slides, use `type=slides` for an H1 header:

...

## Next slides

Use second-level headers to make subsequent slides:
```

1.2. Stepping

Use the symbol ▶ to make the corresponding fragment appear on click.

* Step 1 ▶
* Step 2 ▶
* Step 3 ▶

• Step 1 ▶
• Step 2 ▶
• Step 3 ▶

1.3. Maths

Latex still works here.

A simple test for math:

\[ a + b \geq \sqrt{e} \]

1.4. Stepping through equations

You can also step through equations:
Consider:

$$a = b$$

Then we get:

$$c = d$$

Stepping through partial parts of equations is not supported.

1.5. Sub-slides
You can have “sub slides” to make the presentation nonlinear.

**Defining subslides:** Create a subslide by using header `h3`:

```
### Subslide 1
This is lower.

### Subslide 2
This is even lower.
```

**Showing subslides:** Press down to show the subslides.

**Showing the slides map:** Press `ESC` again to look at the slides map.

1) Subslide 1
This is lower.

2) Subslide 2
This is even lower.

1.6. Presentation mode
Press the key `S` to enter presenters mode.
1.7. **Presenter notes**

Use a blockquote at the end of a slide to encode the presenter notes.

```markdown
## Presenter notes

Use a blockquote at the end of a slide to encode the presenter notes:

> These are presenter notes that will appear in presenter mode.

These are presenter notes that will appear in presenter mode.
```

1.8. **Under the hood**

- All of this is built on top of [reveal.js](https://revealjs.org).
- Please see [reveal.js](https://revealjs.org) for the complete list of features.

1.9. **Figures**

All other duckuments features work as expected.

Example of a figure:

```
<figure class="stretch">
  <img style='width:8em' src="duckietown-logo-transparent.png"/>
</figure>
```

Figure 1.1

1.10. **Subfigures**

Subfigures with animation:
1.11. Cross references

You can link to chapters and vice-versa: Unit D-1 - Creating slides

Link to the previous slide.

1.12. References