Here is a one-page cheat sheet containing some key information from the preceding lessons.

A screenshot of a social media post

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Supporting Materials

[**nd013 P1 lessons cheat sheet**](https://video.udacity-data.com/topher/2019/October/5d97c812_nd013-sdc-p1-lessons-cheat-sheet/nd013-sdc-p1-lessons-cheat-sheet.pdf)

## Project Expectations

For each project in Term 1, keep in mind a few key elements:

* rubric
* code
* writeup
* submission

### Rubric

Each project comes with a rubric detailing the requirements for passing the project. Project reviewers will check your project against the rubric to make sure that it meets specifications.

Before submitting your project, compare your submission against the rubric to make sure you've covered each rubric point.

Here is an example of a project rubric:

A screenshot of a social media post

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Example of a project rubric

### Code

Every project in the term includes code that you will write. For some projects we provide code templates, often in a Jupyter notebook. For other projects, there are no code templates.

In either case, you'll need to submit your code files as part of the project. Each project has specific instructions about what files are required. Make sure that your code is commented and easy for the project reviewers to follow.

For the Jupyter notebooks, sometimes you must run all of the code cells and then export the notebook as an HTML file. The notebook will contain instructions for how to do this.

Because running the code can take anywhere from several minutes to a few hours, the HTML file allows project reviewers to see your notebook's output without having to run the code.

Even if the project requires submission of the HTML output of your Jupyter notebook, please submit the original Jupyter notebook itself, as well.

### Writeup

All of the projects in Term 1 require a writeup. The writeup is your chance to explain how you approached the project.

It is also an opportunity to show your understanding of key concepts in the program.

We have provided writeup templates for every project so that it is clear what information needs to be in each writeup. These templates can be found in each project repository, with the title writeup\_template.md.

Your writeup report should explain how you satisfied each requirement in the project rubric.

The writeups can be turned in either as Markdown files (.md) or PDF files.

### README

GitHub repositories are a convenient way to organize your projects and display them to the world. A GitHub repository also has a README.md file that opens automatically when somebody visits your GitHub repository link.

As a suggestion, the README.md file for each repository can include the following information:

* a list of files contained in the repository with a brief description of each file
* any instructions someone might need for running your code
* an overview of the project

Here is an example of a README file:

A screenshot of a social media post

Description automatically generated

Example of a README file

If you are unfamiliar with GitHub , Udacity has a brief [GitHub tutorial](http://blog.udacity.com/2015/06/a-beginners-git-github-tutorial.html) to get you started. Udacity also provides a more detailed free [course on git and GitHub](https://www.udacity.com/course/how-to-use-git-and-github--ud775).

To learn about README files and Markdown, Udacity provides a free [course on READMEs](https://www.udacity.com/course/writing-readmes--ud777), as well.

GitHub also provides a [tutorial](https://guides.github.com/features/mastering-markdown/) about creating Markdown files.

## Local Setup Users Start Here:

Navigate to [the project repository on GitHub](https://github.com/udacity/CarND-LaneLines-P1) and have a look at the Readme file for detailed instructions on how to get setup with Python and OpenCV and how to access the Jupyter Notebook containing the project code. You will need to download, or git clone, this repository in order to complete the project.

If you are unfamiliar with Jupyter Notebooks, check out this quick Udacity primer on [Anaconda and Jupyter Notebooks](https://classroom.udacity.com/courses/ud1111).

## Workspace Users Start Here:

In this project, you will be writing code to identify lane lines on the road, first in an image, and later in a video stream (really just a series of images). To complete this project you will use the tools you learned about in the lesson, and build upon them.

Your first goal is to write code including a series of steps (pipeline) that identify and draw the lane lines on a few test images. Once you can successfully identify the lines in an image, you can cut and paste your code into the block provided to run on a video stream.

You will then refine your pipeline with parameter tuning and by averaging and extrapolating the lines.

Finally, you'll make a brief writeup report. The workspace github repository has a writeup\_template.md that can be used as a guide.

Have a look at the video clip called "P1\_example.mp4" in the repository to see an example of what your final output should look like. Two videos are provided for you to run your code on. These are called "solidWhiteRight.mp4" and solidYellowLeft.mp4".

This **workspace** is designed to be a simple, easy to use environment in which you can code and run the Finding Lane Lines project.

For tips on workspace use, please review the earlier Workspaces lesson.

## Accessing and using the workspace:

* Go to the workspace node and the project JUPYTER notebook will automatically load
* Complete the project using the instructions in the notebook
* The project repo is already in the workspace. To see other files in the repo click on the JUPYTER icon. This will expose the root directory. From there click on the project folder.

## Commit to GitHub

Students are highly encouraged to commit their project to a GitHub repo. To do this, you must change the upstream of the current repository and add your credentials. We have supplied a bash script to help you do this. Please open up a terminal, navigate to the project repository, and enter: ./set\_git.sh, then follow the prompts. This will set the upstream remote to your own repository and add your email and username to the git configuration. At this time we are not configuring passwords, so you will need to enter your username and password for each push. Since credentials are not persistent, it will be necessary to run this script each time you open, refresh, or reset the workspace.

## Things to keep in mind:

* If you leave your workspace unattended, it will time out and need to be refreshed. Your most recent work will be restored, but the list of open files or any running shell sessions will not be restored.

## Evaluation

Once you have completed your project, use the [**Project Rubric**](https://review.udacity.com/#!/rubrics/1967/view) to review the project. If you have covered all of the points in the rubric, then you are ready to submit! If you see room for improvement in **any** category in which you do not meet specifications, keep working!

Your project will be evaluated by a Udacity reviewer according to the same [**Project Rubric**](https://review.udacity.com/#!/rubrics/1967/view). Your project must "meet specifications" in each category in order for your submission to pass.

### Ready to submit your project?

#### Local Setup Users

You can either submit your project as a link to a GitHub repository or as a ZIP file. When submitting a GitHub repository, we advise creating a new repository, specific to the project you are submitting.

#### Workspace Users

Make sure your workspace contains at least :

* Jupyter Notebook with your project code
* writeup report (md or pdf file)

Click on the **Submit Project** button and follow the instructions to submit!

## Project Support

If you are stuck or having difficulties with the project, don't lose hope! Remember to talk to your mentors and fellow students in your Study Group, as well as ask (and answer!) questions on [Knowledge](https://knowledge.udacity.com/) tagged with the project name. We also have a previously recorded project Q&A that you can watch [here](https://youtu.be/hnXkCiM2RSg)!