# ExampleJupyterNotebookReport

September 28, 2023

## 1 Example Solution to Homework 1

You might want to do your entire analysis and report using a jupyter notebook.

This examle notebook reproduces the content of the latex example, and shows how to make a simple graph

## 2 Problem 1: Fundemental tricks for nice Jupyter notebooks (*50 points*)

Write your solution here. If there were math to write, you can use latex commands. Jupyter will translate those into nice equations

$$\sin A \cos B = \frac{1}{2}\left[\sin(A-B) + \sin(A+B)\right]$$
$$\sin A \sin B = \frac{1}{2}\left[\sin(A-B) - \cos(A+B)\right]$$
$$\cos A \cos B = \frac{1}{2}\left[\cos(A-B) + \cos(A+B)\right]$$

If you need to include a block of code written in C/C++:

```
// Some interesting code here
int a = 0;
int b = 1;
```

or show some command run in the shell

```
>>> ls -a
```

this works out-of-the-box with syntax highlighting.

If the code had output, we could include it like so:

```
[ 0.0156615   0.00483956  0.00490249  0.00701772  0.0049713   0.00542965
  0.00486095  0.00420872  0.02011727]
```

The supercomputer Blue Waters has hundreds of thousands of CPUs. This can be included as follows

## 3 Problem 2: analysis of a data file (*50 points*)

Scott's CPU monitoring script (task 1 of lab 2) produced a data file called CPUData.dat

In this section we will see how Python code can be easily included into the notebook for quick data analysis

[ ]:
```
import numpy as np
from matplotlib import pyplot as plt

data = np.loadtxt('CPUData.dat') # <- Will automattically ignore lines starting␣
 ↪with #

x = data[:,0]
y = data[:,1]

plt.figure()
plt.plot(x,y,'r--',label='Google Chrome')
plt.xlabel('Unix Coordinate Time (seconds)')
plt.ylabel('CPU Usage (percentage)')
plt.title('CPU Usage Vs Time')
plt.legend(loc=3)
#plt.show()
plt.savefig("cpu_vs_time.png",bbox="tight") # bbox = bounding box; this is how␣
 ↪to directly save a figure if needed
```

If this were a real homework report, you would then provide some descriptive text here describing the figure and its importance in some detail.

### 3.1 Final step... export as a PDF

You can turn your notebook into a PDF by doing File->Download As from the menu.

If this were a real homework, you would turn in the PDF in class while also uploading the Jupyter notebook to bitbucket.

[ ]:
```

```