Lab 3 - due 23.59 Wednesday 7 March 2018

February 26, 2018
References in your solutions

Please add references to any external material that you base your answers on.

Study material

- Matplotlib documentation https://matplotlib.org/.

Problems

**Homework question 1**
Solomon question 3.1

**Homework question 2**
Solomon question 3.2

**Homework question 3**
Solomon question 3.6

**Homework question 4**
Solomon question 3.12

**Homework question 5**
Solomon question 4.1

**Homework question 6**
Solomon question 4.3

**Homework question 7**
Solomon question 4.4

**Homework question 8**
Solomon question 4.13

**Homework question 9**
The November Top500 list can be found at https://www.top500.org/list/2017/11/. Using Jupyter notebook, make a bar chart (or other chart) showing country system share and performance. Can you make your graph more illustrative than the pie chart at https://www.top500.org/statistics/list/? You may find the following helpful https://matplotlib.org/.
Homework question 10

Explain why

\[ \int_0^1 \frac{4}{1 + x^2} dx = \pi \]

Write two programs in Python to calculate this using the Monte Carlo method, and using a summation method. Examine how the errors in your programs change as you increase the number of evaluation points - make a plot of error against number of evaluation points. For the Monte Carlo code, one error evaluation for each fixed number of evaluation points is sufficient, though you may wish to run the program several times.

Homework question 11

How long did this take you?