Machine Learning

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Objectives

- understand and explain basic concepts of machine learning
- understand formalized concepts and methods
- be able to implement concepts and methods in the form of algorithms
- be able to sensibly select, adapt, and apply relevant methods
- be able to educate oneself

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Related Fields

1. Statistics [paradigms, models]
2. Mathematics

3. Artificial Intelligence [methods, algorithms]
4. Heuristic Search
5. Information Retrieval
6. Knowledge Processing
7. Natural Language Processing

8. Decision Support Systems [applications]
9. Medical Systems
10. Search Engines
11. Self-driving cars
12. Writing Support Systems

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Literature

Machine Learning:

- C.M. Bishop. [Interview 2018 @ MS Research]
  Pattern Recognition and Machine Learning
  2nd edition, Springer 2006.

- N. Cristianini, J. Shawe-Taylor.
  An Introduction to Support Vector Machines and Other Kernel-based Learning Methods
  Cambridge University Press, 2000.

- T. Hastie, R. Tibshirani, J. Friedman.
  The Elements of Statistical Learning
  2nd edition, Springer, 2009. statweb.stanford.edu/∼hastie/ElemStatLearn/ (2017)

- T. Mitchell.
  Machine Learning
  1st edition, McGraw-Hill, 1997. www.cs.cmu.edu/∼tom/mlbook.html

- V. Vapnik.
  The Nature of Statistical Learning Theory
  2nd edition, Springer 2000.

- I. Goodfellow, Y. Bengio, A. Courville.
  Deep Learning
  MIT Press, 2016. deeplearningbook.org

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Software

Programming:

- The Jupyter Project.
  JupyterHub
  Version 3.0. jupyter.org

- Microsoft Corporation.
  Visual Studio Code
  Version 1.71. code.visualstudio.com

- JetBrains, Inc.
  PyCharm IDE
  Version 2022.2.2. www.jetbrains.com/pycharm

Machine Learning:

- *NumPy*
  Version 1.23. numpy.org

- *scikit-learn: Machine Learning in Python*
  Version 1.1. scikit-learn.org

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Software

Statistics:

- R Development Core Team.
  R
  Version 4.2. www.r-project.org

- E. Jones, T. Oliphant, P. Peterson and others.
  SciPy
  Version 1.9. www.scipy.org

- J.W. Eaton.
  GNU Octave
  Version 7.2. www.gnu.org/software/octave

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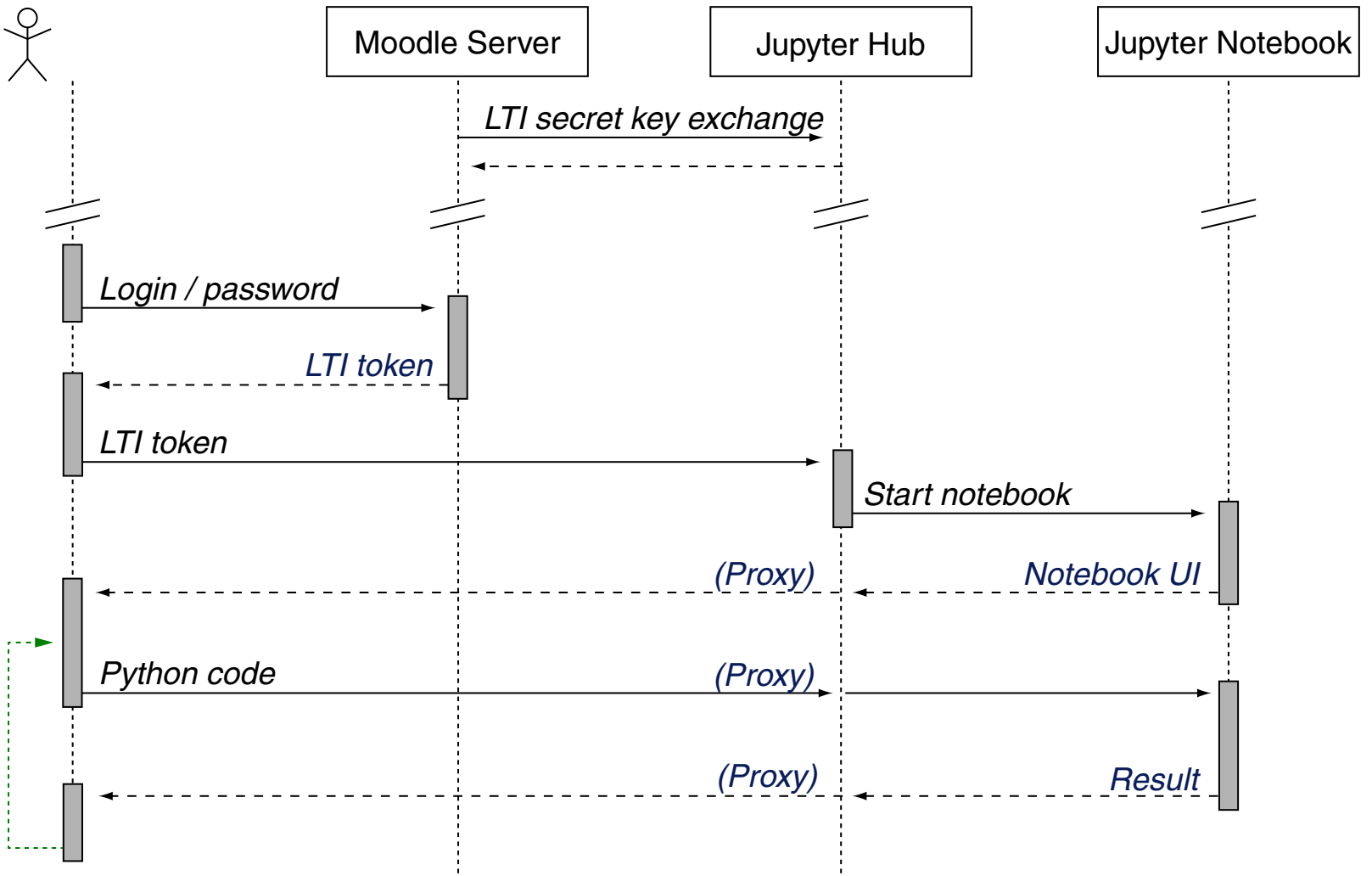
Software

Lab Class Setup



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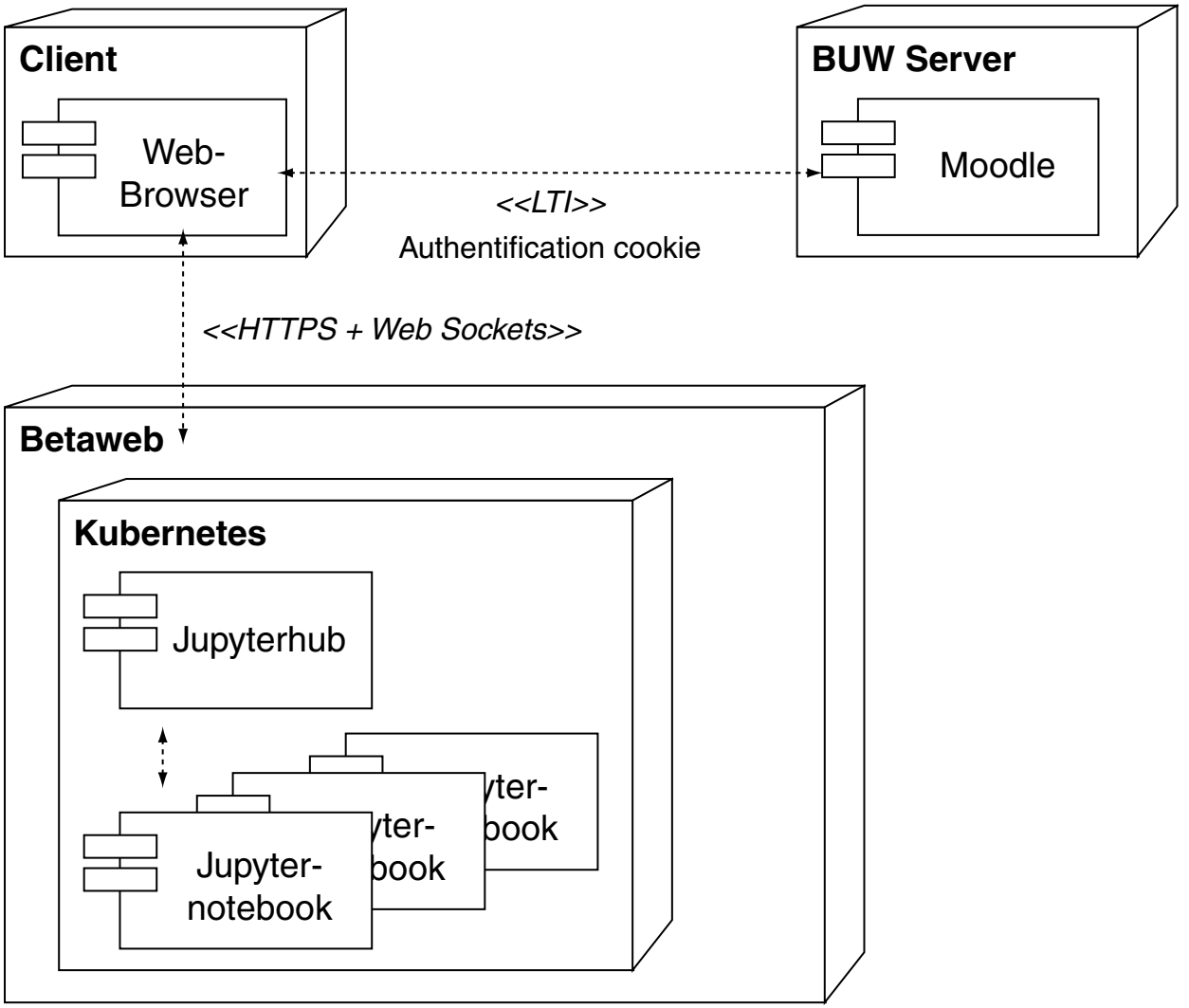
Software

Lab Class Setup (continued)



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