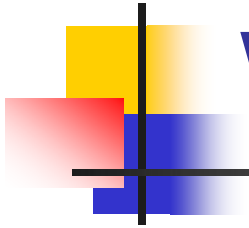
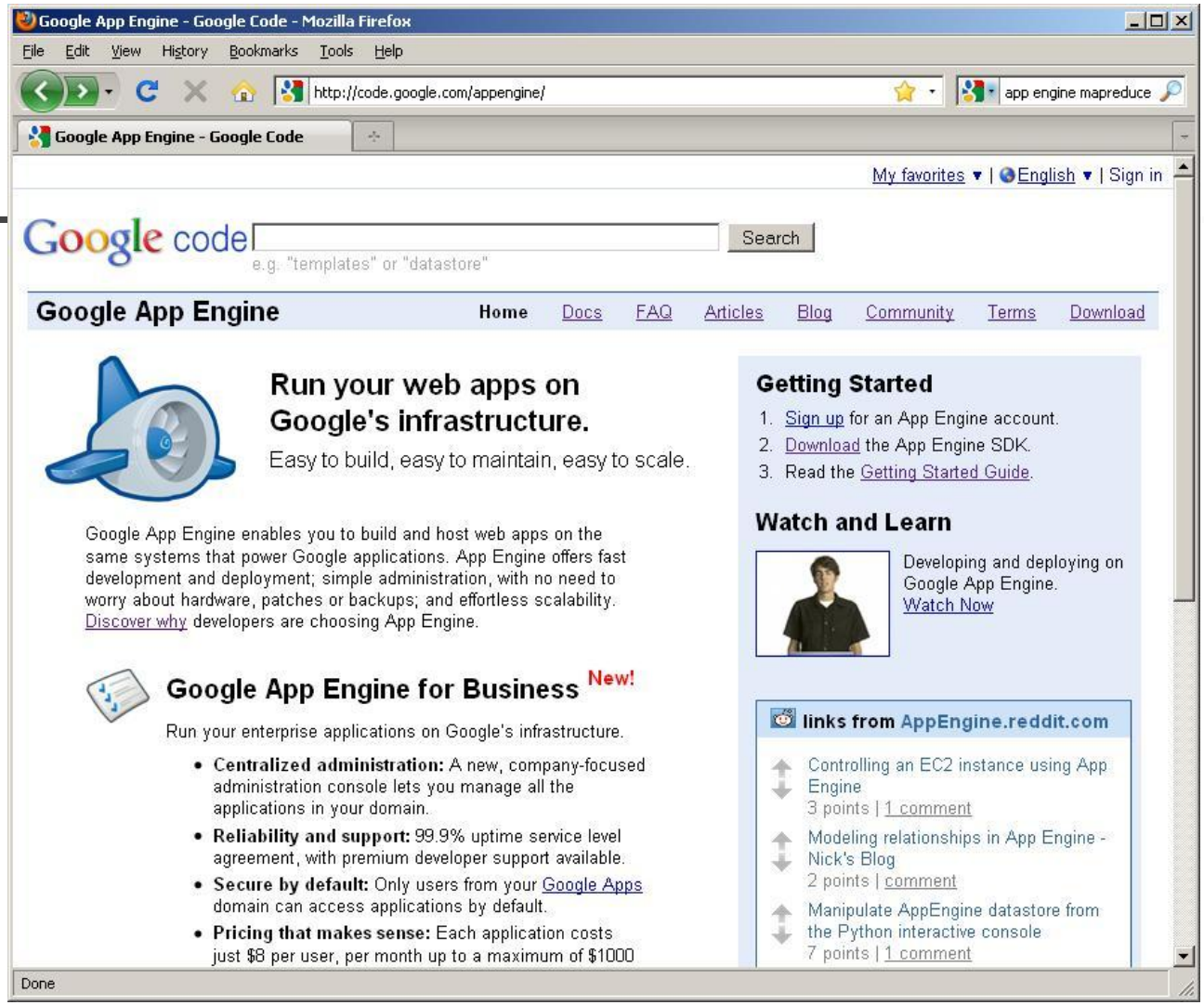
Cloud Computing for the Humanities

Graham Wilcock
University of Helsinki



What is Cloud Computing?

- ”Run your app in the cloud”
  - Using somebody else’s computers
- Computing resources on-demand
  - Like electricity, or pizza delivery
- Platform-as-a-Service (PaaS)
  - Example: Google App Engine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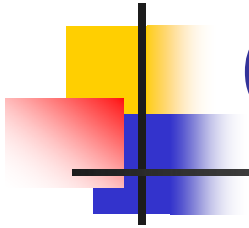
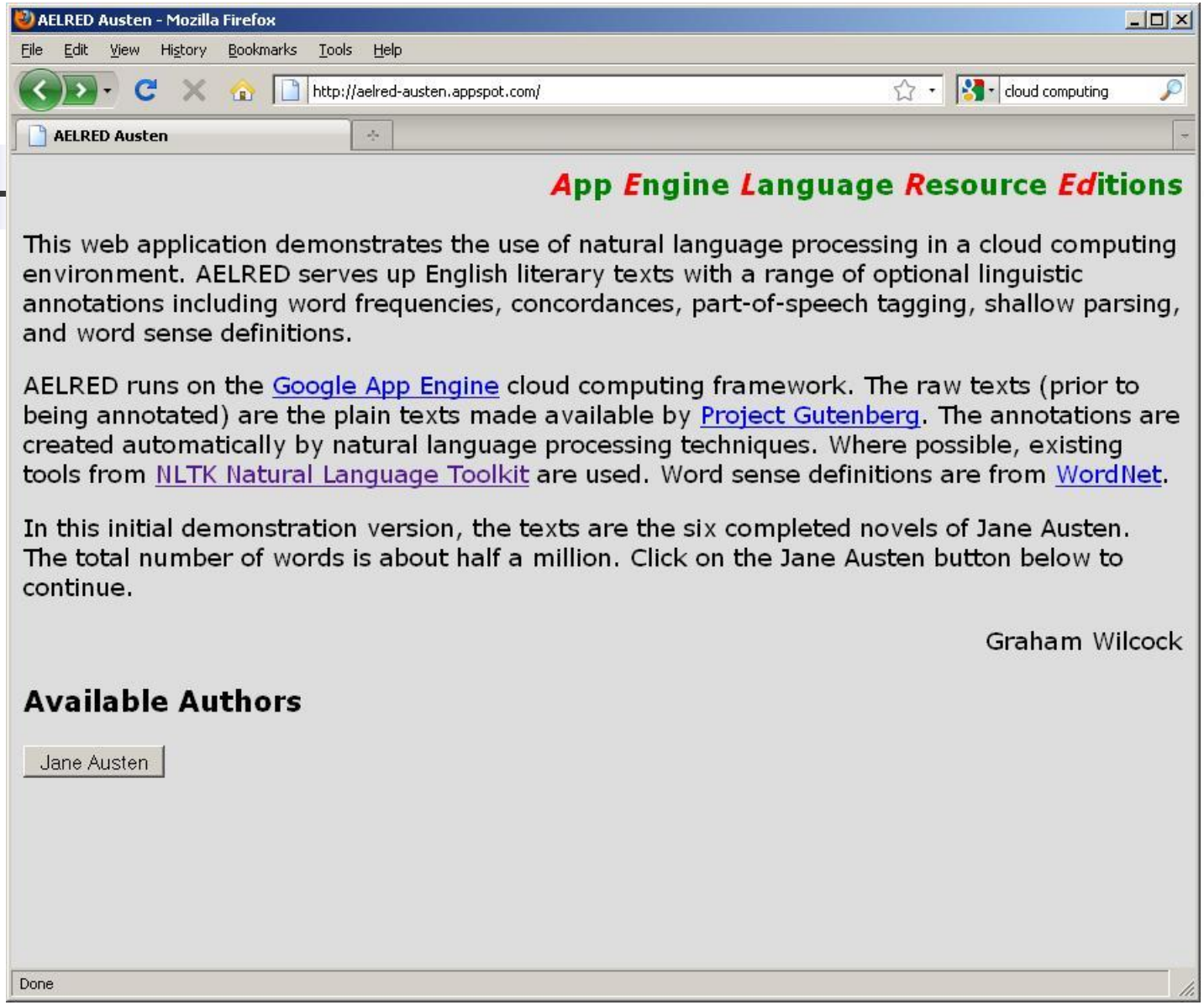
Run your enterprise applications on Google's infrastructure.
Centralized administration: A new, company-focused administration console lets you manage all the applications in your domain.
Reliability and support: 99.9% uptime service level agreement, with premium developer support available.
Secure by default: Only users from your Google Apps domain can access applications by default.
Pricing that makes sense: Each application costs just $8 per user, per month up to a maximum of $1000
Getting Started
1. Sign up for an App Engine account.
2. Download the App Engine SDK.
3. Read the Getting Started Guide.
Watch and Learn
Developing and deploying on Google App Engine.
Watch Now
links from AppEngine.reddit.com
Controlling an EC2 instance using App Engine
3 points | 1 comment
Modeling relationships in App Engine - Nick's Blog
2 points | comment
Manipulate AppEngine datastore from the Python interactive console
7 points | 1 comment
Done



Google App Engine

- ”Run your web apps on Google’s infrastructure”
  - http://your-app-name.appspot.com
- My web app is AELRED:
  - *App Engine Language Resource Editions*
  - First version: Jane Austen novels
  - http://aelred-austen.appspot.com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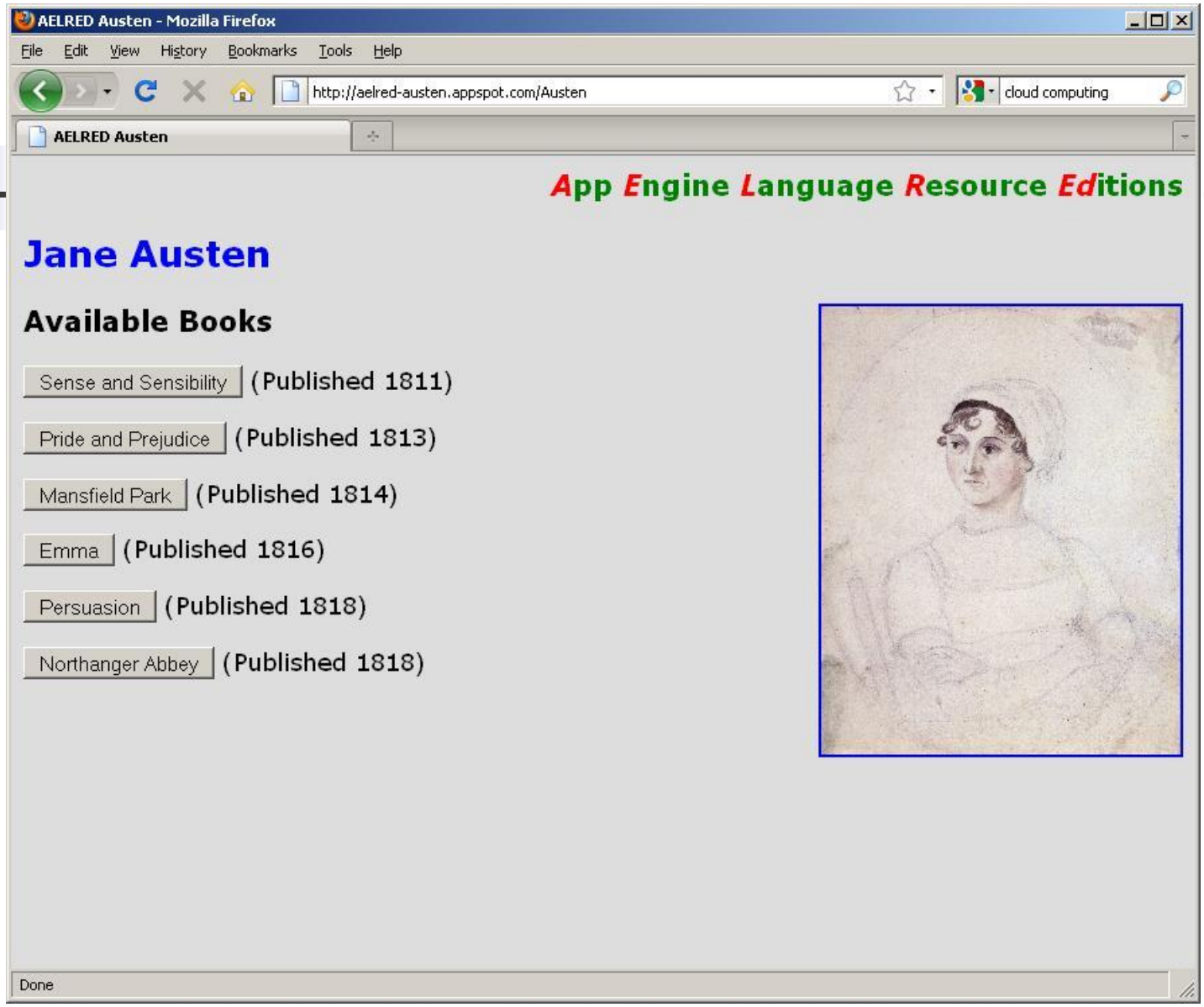
cloud computing
AELRED Austen
App Engine Language Resource Editions
This web application demonstrates the use of natural language processing in a cloud computing environment. AELRED serves up English literary texts with a range of optional linguistic annotations including word frequencies, concordances, part-of-speech tagging, shallow parsing, and word sense definitions.
AELRED runs on the Google App Engine cloud computing framework. The raw texts (prior to being annotated) are the plain texts made available by Project Gutenberg. The annotations are created automatically by natural language processing techniques. Where possible, existing tools from NLTK Natural Language Toolkit are used. Word sense definitions are from WordNet.
In this initial demonstration version, the texts are the six completed novels of Jane Austen. The total number of words is about half a million. Click on the Jane Austen button below to continue.
Graham Wilcock
Available Authors
Jane Austen
Done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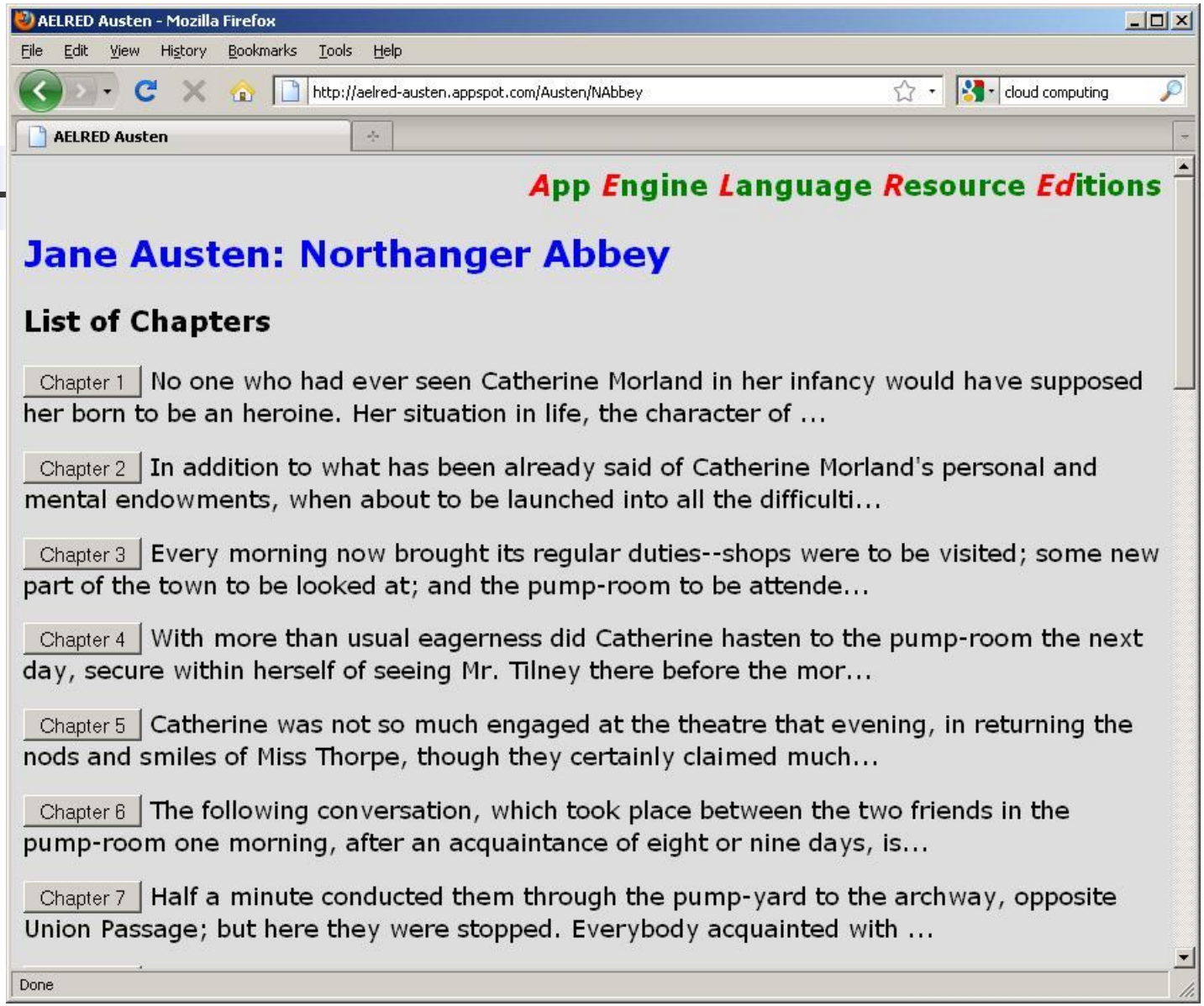
Jane Austen
Available Books
Sense and Sensibility (Published 1811)
Pride and Prejudice (Published 1813)
Mansfield Park (Published 1814)
Emma (Published 1816)
Persuasion (Published 1818)
Northanger Abbey (Published 1818)
Done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Jane Austen: Northanger Abbey
List of Chapters
Chapter 1 No one who had ever seen Catherine Morland in her infancy would have supposed her born to be an heroine. Her situation in life, the character of ...
Chapter 2 In addition to what has been already said of Catherine Morland's personal and mental endowments, when about to be launched into all the difficulti...
Chapter 3 Every morning now brought its regular duties--shops were to be visited; some new part of the town to be looked at; and the pump-room to be attende...
Chapter 4 With more than usual eagerness did Catherine hasten to the pump-room the next day, secure within herself of seeing Mr. Tilney there before the mor...
Chapter 5 Catherine was not so much engaged at the theatre that evening, in returning the nods and smiles of Miss Thorpe, though they certainly claimed much...
Chapter 6 The following conversation, which took place between the two friends in the pump-room one morning, after an acquaintance of eight or nine days, is...
Chapter 7 Half a minute conducted them through the pump-yard to the archway, opposite Union Passage; but here they were stopped. Everybody acquainted with ...
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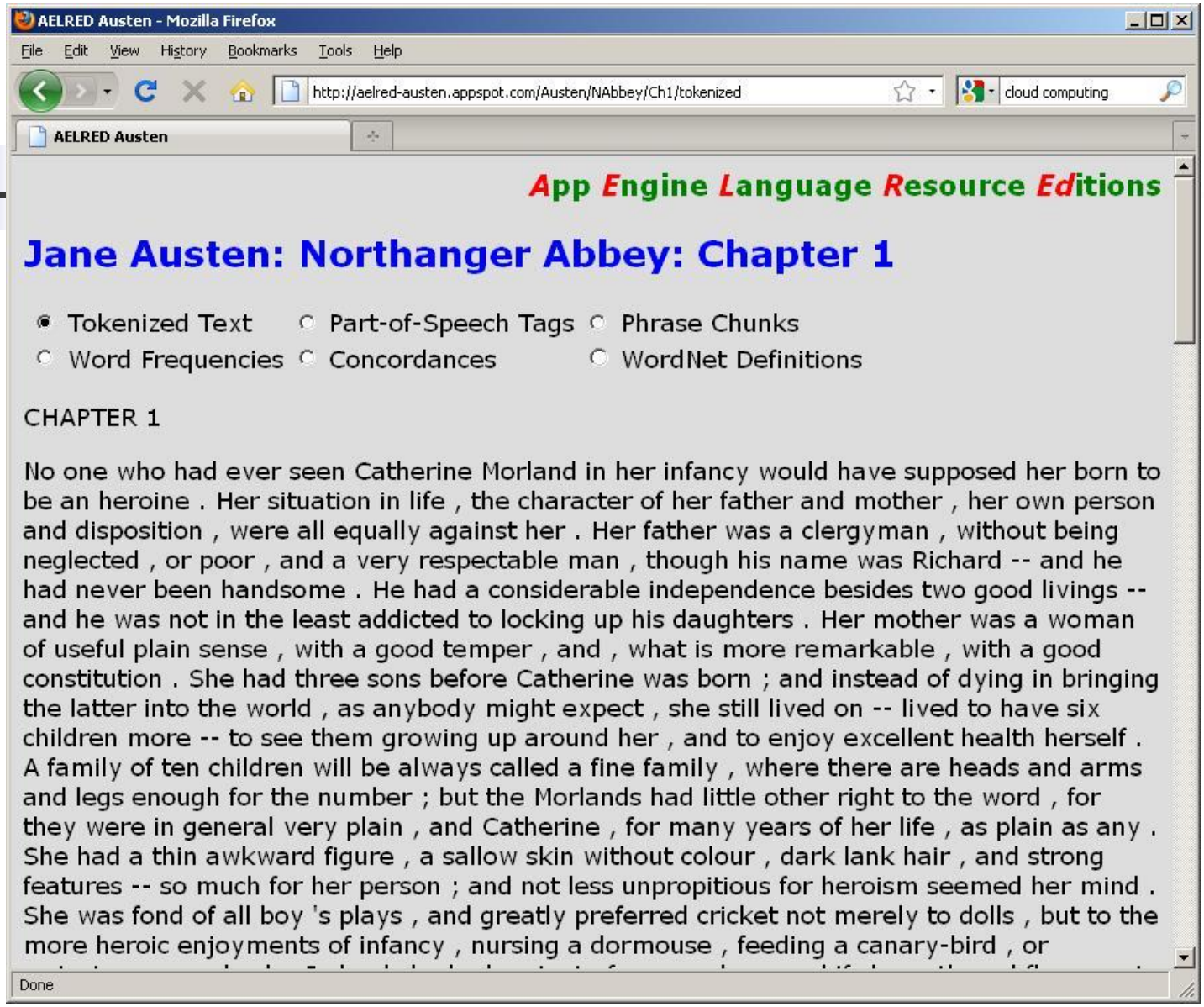
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Part-of-Speech Tags
Phrase Chunks
Word Frequencies
Concordances
WordNet Definitions
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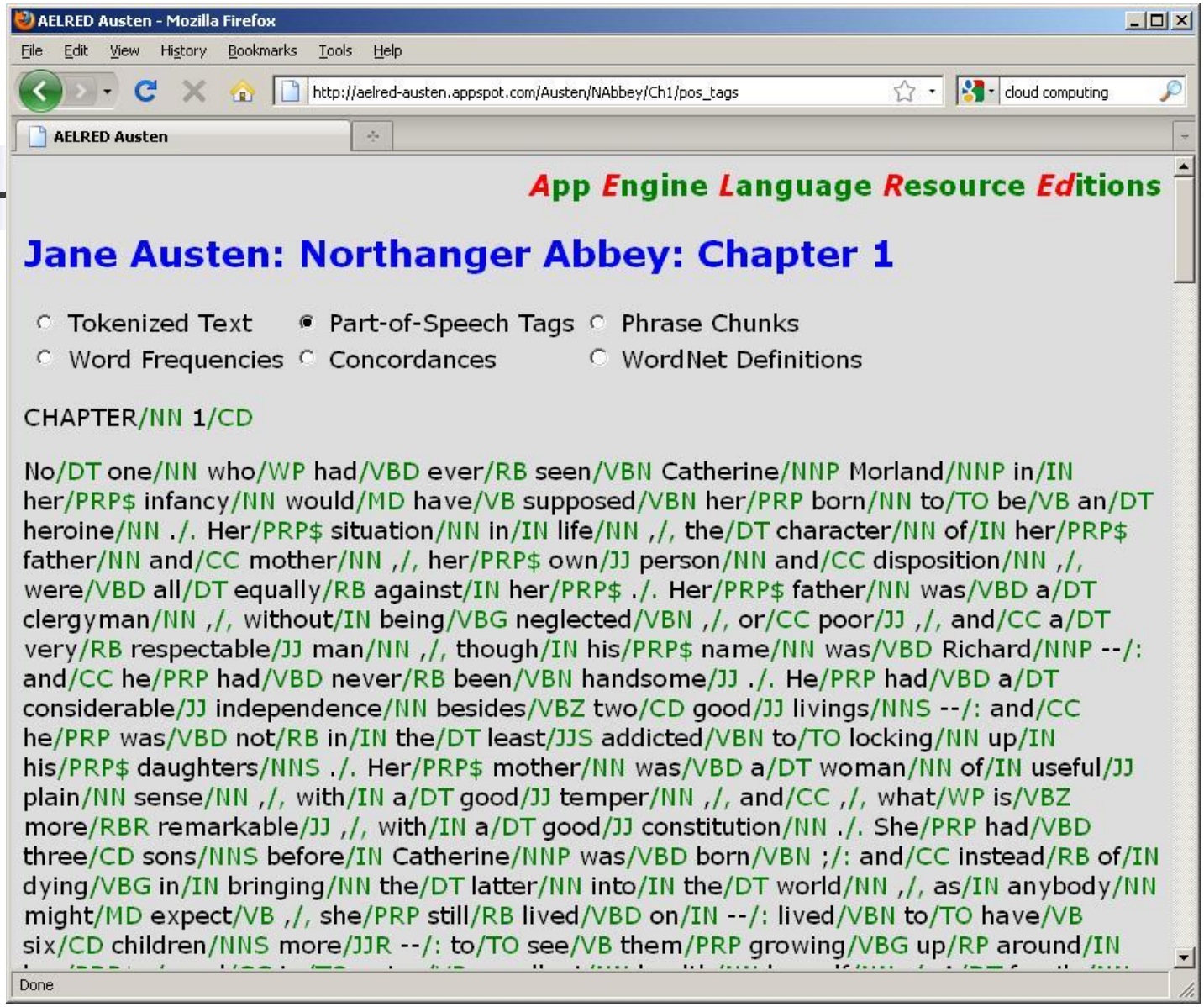
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CHAPTER/NN 1/CD
No/DT one/NN who/WP had/VBD ever/RB seen/VBN Catherine/NNP Morland/NNP in/IN her/PRP$ infancy/NN would/MD have/VB supposed/VBN her/PRP born/NN to/TO be/VB an/DT heroine/NN ./. Her/PRP$ situation/NN in/IN life/NN ,/, the/DT character/NN of/IN her/PRP$ father/NN and/CC mother/NN ,/, her/PRP$ own/JJ person/NN and/CC disposition/NN ,/, were/VBD all/DT equally/RB against/IN her/PRP$ ./. Her/PRP$ father/NN was/VBD a/DT clergyman/NN ,/, without/IN being/VBG neglected/VBN ,/, or/CC poor/JJ ,/, and/CC a/DT very/RB respectable/JJ man/NN ,/, though/IN his/PRP$ name/NN was/VBD Richard/NNP --/: and/CC he/PRP had/VBD never/RB been/VBN handsome/JJ ./. He/PRP had/VBD a/DT considerable/JJ independence/NN besides/VBZ two/CD good/JJ livings/NNS --/: and/CC he/PRP was/VBD not/RB in/IN the/DT least/JJS addicted/VBN to/TO locking/NN up/IN his/PRP$ daughters/NNS ./. Her/PRP$ mother/NN was/VBD a/DT woman/NN of/IN useful/JJ plain/NN sense/NN ,/, with/IN a/DT good/JJ temper/NN ,/, and/CC ,/, what/WP is/VBZ more/RBR remarkable/JJ ,/, with/IN a/DT good/JJ constitution/NN ./. She/PRP had/VBD three/CD sons/NNS before/IN Catherine/NNP was/VBD born/VBN ;/: and/CC instead/RB of/IN dying/VBG in/IN bringing/NN the/DT latter/NN into/IN the/DT world/NN ,/, as/IN anybody/NN might/MD expect/VB ,/, she/PRP still/RB lived/VBD on/IN --/: lived/VBN to/TO have/VB six/CD children/NNS more/JJR --/: to/TO see/VB them/PRP growing/VBG up/RP around/IN
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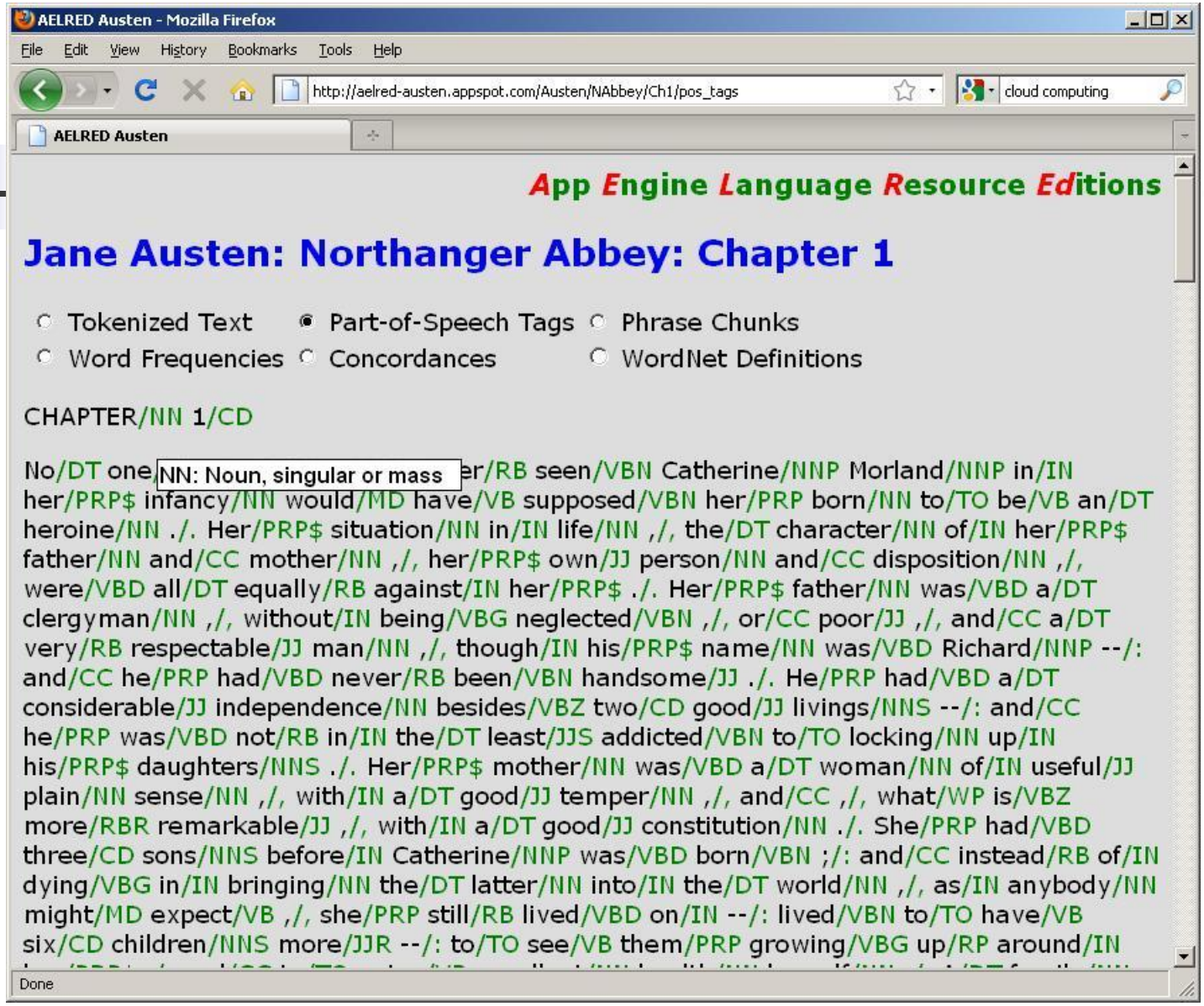
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CHAPTER/NN 1/CD
NN: Noun, singular or mass
No/DT one/NN ever/RB seen/VBN Catherine/NNP Morland/NNP in/IN her/PRP$ infancy/NN would/MD have/VB supposed/VBN her/PRP born/NN to/TO be/VB an/DT heroine/NN ./. Her/PRP$ situation/NN in/IN life/NN ,/, the/DT character/NN of/IN her/PRP$ father/NN and/CC mother/NN ,/, her/PRP$ own/JJ person/NN and/CC disposition/NN ,/, were/VBD all/DT equally/RB against/IN her/PRP$ ./. Her/PRP$ father/NN was/VBD a/DT clergyman/NN ,/, without/IN being/VBG neglected/VBN ,/, or/CC poor/JJ ,/, and/CC a/DT very/RB respectable/JJ man/NN ,/, though/IN his/PRP$ name/NN was/VBD Richard/NNP --/: and/CC he/PRP had/VBD never/RB been/VBN handsome/JJ ./. He/PRP had/VBD a/DT considerable/JJ independence/NN besides/VBZ two/CD good/JJ livings/NNS --/: and/CC he/PRP was/VBD not/RB in/IN the/DT least/JJS addicted/VBN to/TO locking/NN up/IN his/PRP$ daughters/NNS ./. Her/PRP$ mother/NN was/VBD a/DT woman/NN of/IN useful/JJ plain/NN sense/NN ,/, with/IN a/DT good/JJ temper/NN ,/, and/CC ,/, what/WP is/VBZ more/RBR remarkable/JJ ,/, with/IN a/DT good/JJ constitution/NN ./. She/PRP had/VBD three/CD sons/NNS before/IN Catherine/NNP was/VBD born/VBN ;/: and/CC instead/RB of/IN dying/VBG in/IN bringing/NN the/DT latter/NN into/IN the/DT world/NN ,/, as/IN anybody/NN might/MD expect/VB ,/, she/PRP still/RB lived/VBD on/IN --/: lived/VBN to/TO have/VB six/CD children/NNS more/JJR --/: to/TO see/VB them/PRP growing/VBG up/RP around/IN
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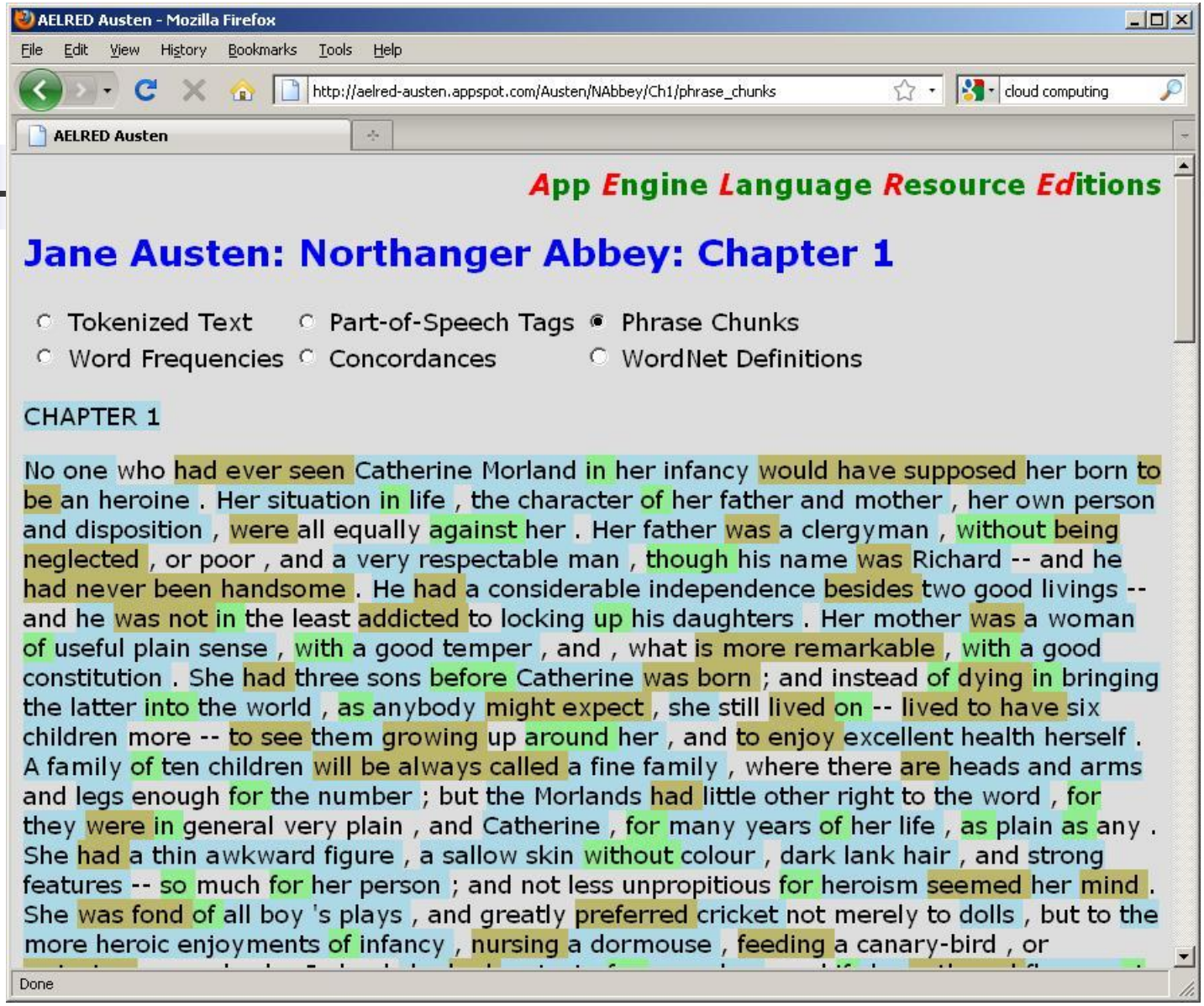
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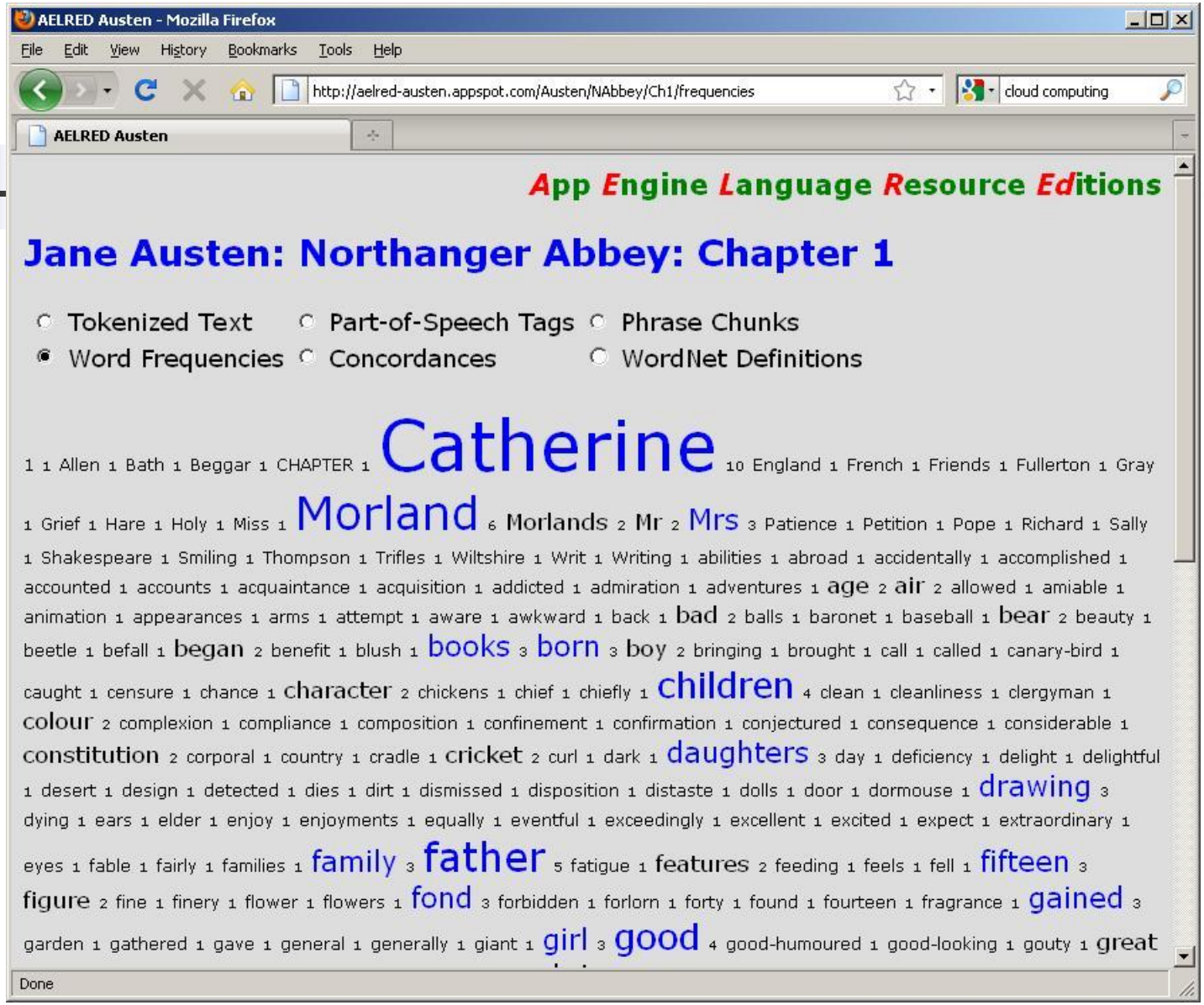
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1 1 Allen 1 Bath 1 Beggar 1 CHAPTER 1 Catherine 10 England 1 French 1 Friends 1 Fullerton 1 Gray 1 Grief 1 Hare 1 Holy 1 Miss 1 Morland 6 Morlands 2 Mr 2 Mrs 3 Patience 1 Petition 1 Pope 1 Richard 1 Sally 1 Shakespeare 1 Smiling 1 Thompson 1 Trifles 1 Wiltshire 1 Writ 1 Writing 1 abilities 1 abroad 1 accidentally 1 accomplished 1 accounted 1 accounts 1 acquaintance 1 acquisition 1 addicted 1 admiration 1 adventures 1 age 2 air 2 allowed 1 amiable 1 animation 1 appearances 1 arms 1 attempt 1 aware 1 awkward 1 back 1 bad 2 balls 1 baronet 1 baseball 1 bear 2 beauty 1 beetle 1 befall 1 began 2 benefit 1 blush 1 books 3 born 3 boy 2 bringing 1 brought 1 call 1 called 1 canary-bird 1 caught 1 censure 1 chance 1 character 2 chickens 1 chief 1 chiefly 1 children 4 clean 1 cleanliness 1 clergyman 1 colour 2 complexion 1 compliance 1 composition 1 confinement 1 confirmation 1 conjectured 1 consequence 1 considerable 1 constitution 2 corporal 1 country 1 cradle 1 cricket 2 curl 1 dark 1 daughters 3 day 1 deficiency 1 delight 1 delightful 1 desert 1 design 1 detected 1 dies 1 dirt 1 dismissed 1 disposition 1 distaste 1 dolls 1 door 1 dormouse 1 drawing 3 dying 1 ears 1 elder 1 enjoy 1 enjoyments 1 equally 1 eventful 1 exceedingly 1 excellent 1 excited 1 expect 1 extraordinary 1 eyes 1 fable 1 fairly 1 families 1 family 3 father 5 fatigue 1 features 2 feeding 1 feels 1 fell 1 fifteen 3 figure 2 fine 1 finery 1 flower 1 flowers 1 fond 3 forbidden 1 forlorn 1 forty 1 found 1 fourteen 1 fragrance 1 gained 3 garden 1 gathered 1 gave 1 general 1 generally 1 giant 1 girl 3 good 4 good-humoured 1 good-looking 1 gouty 1 great
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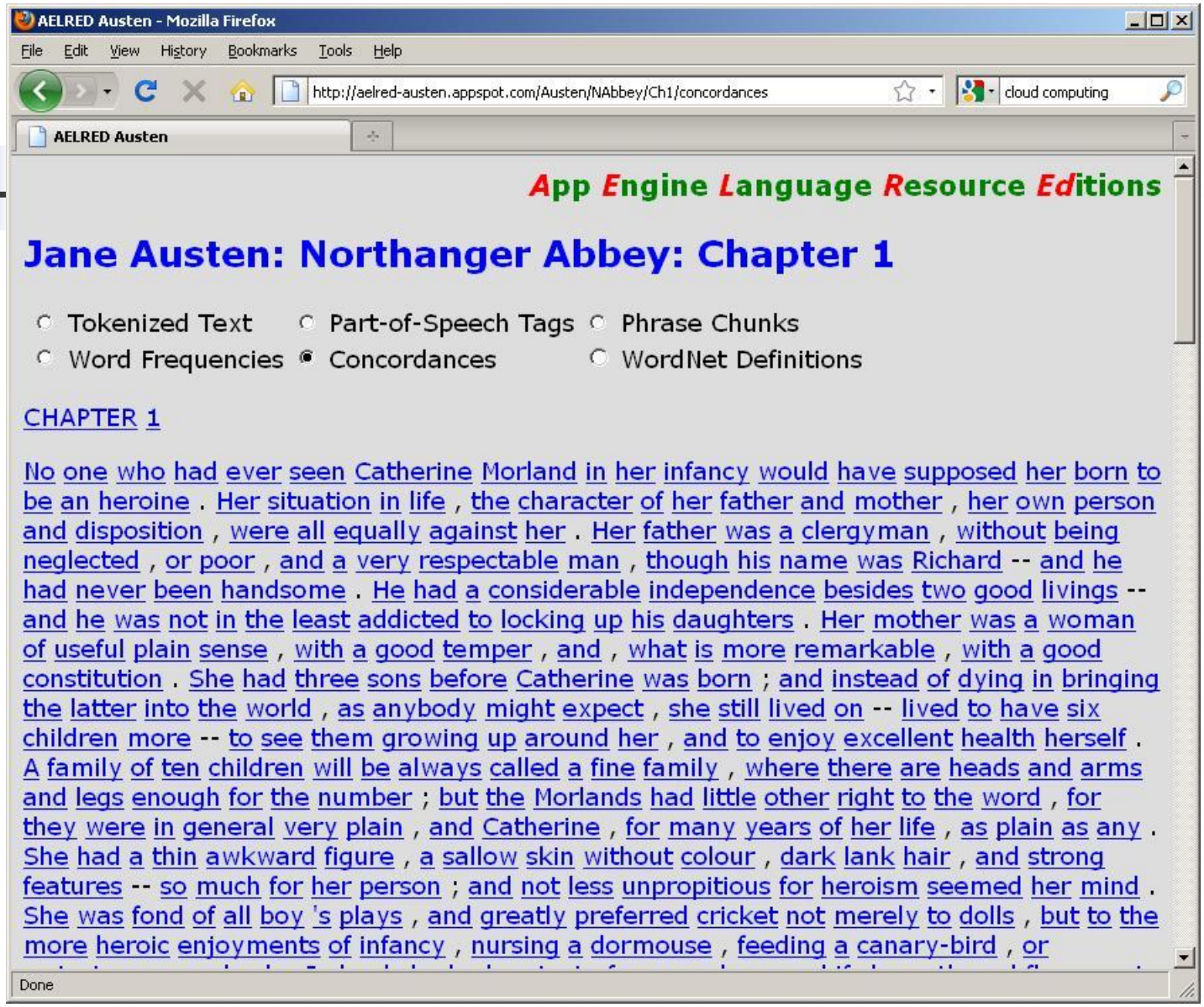
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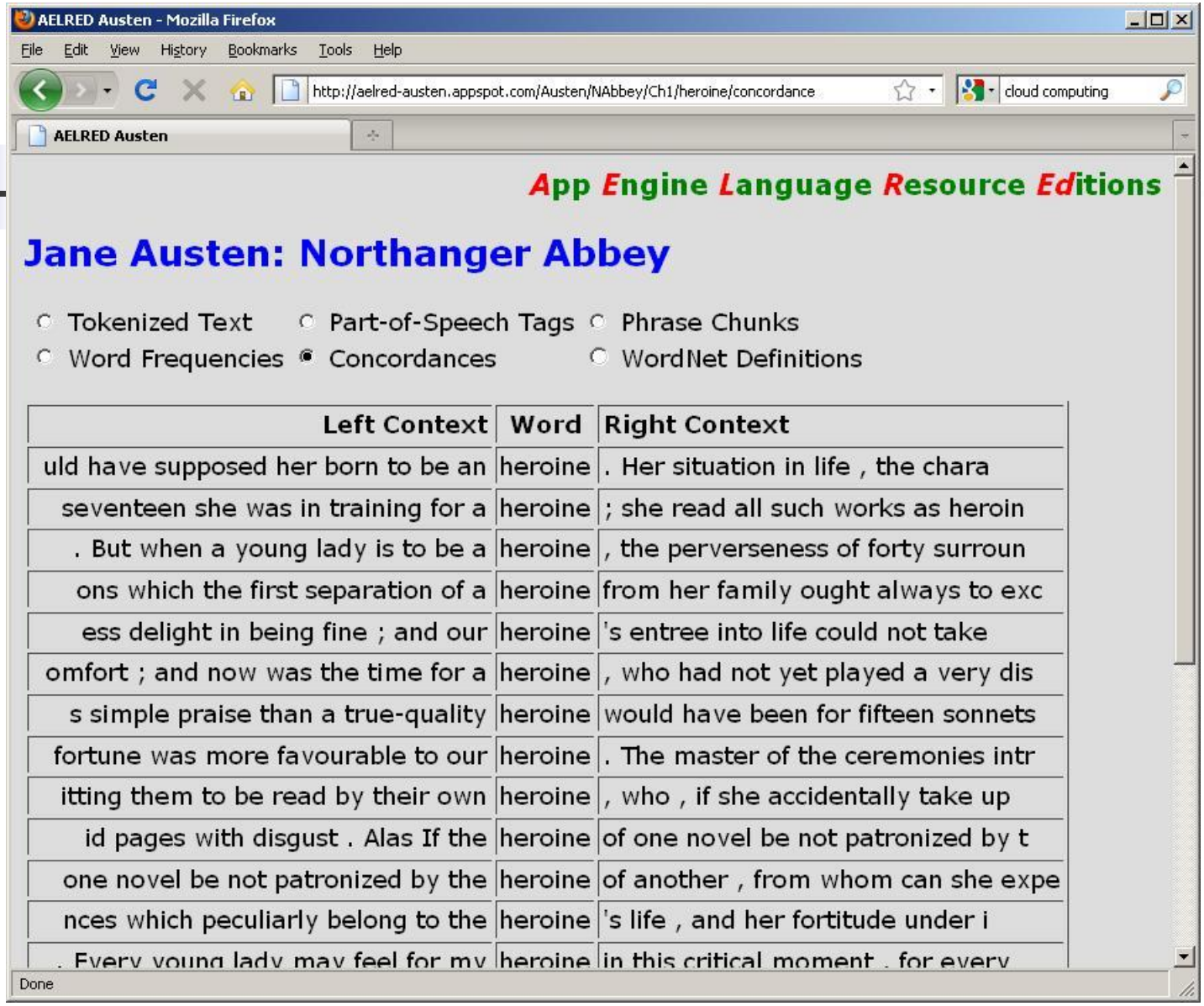
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Concordances
WordNet Definitions
Left Context | Word | Right Context
uld have supposed her born to be an | heroine | . Her situation in life , the chara
seventeen she was in training for a | heroine | ; she read all such works as heroin
. But when a young lady is to be a | heroine | , the perverseness of forty surroun
ons which the first separation of a | heroine | from her family ought always to exc
ess delight in being fine ; and our | heroine | 's entree into life could not take
omfort ; and now was the time for a | heroine | , who had not yet played a very dis
s simple praise than a true-quality | heroine | would have been for fifteen sonnets
fortune was more favourable to our | heroine | . The master of the ceremonies intr
itting them to be read by their own | heroine | , who , if she accidentally take up
id pages with disgust . Alas If the | heroine | of one novel be not patronized by t
one novel be not patronized by the | heroine | of another , from whom can she expe
nces which peculiarly belong to the | heroine | 's life , and her fortitude under i
. Every young lady may feel for my | heroine | in this critical moment , for every
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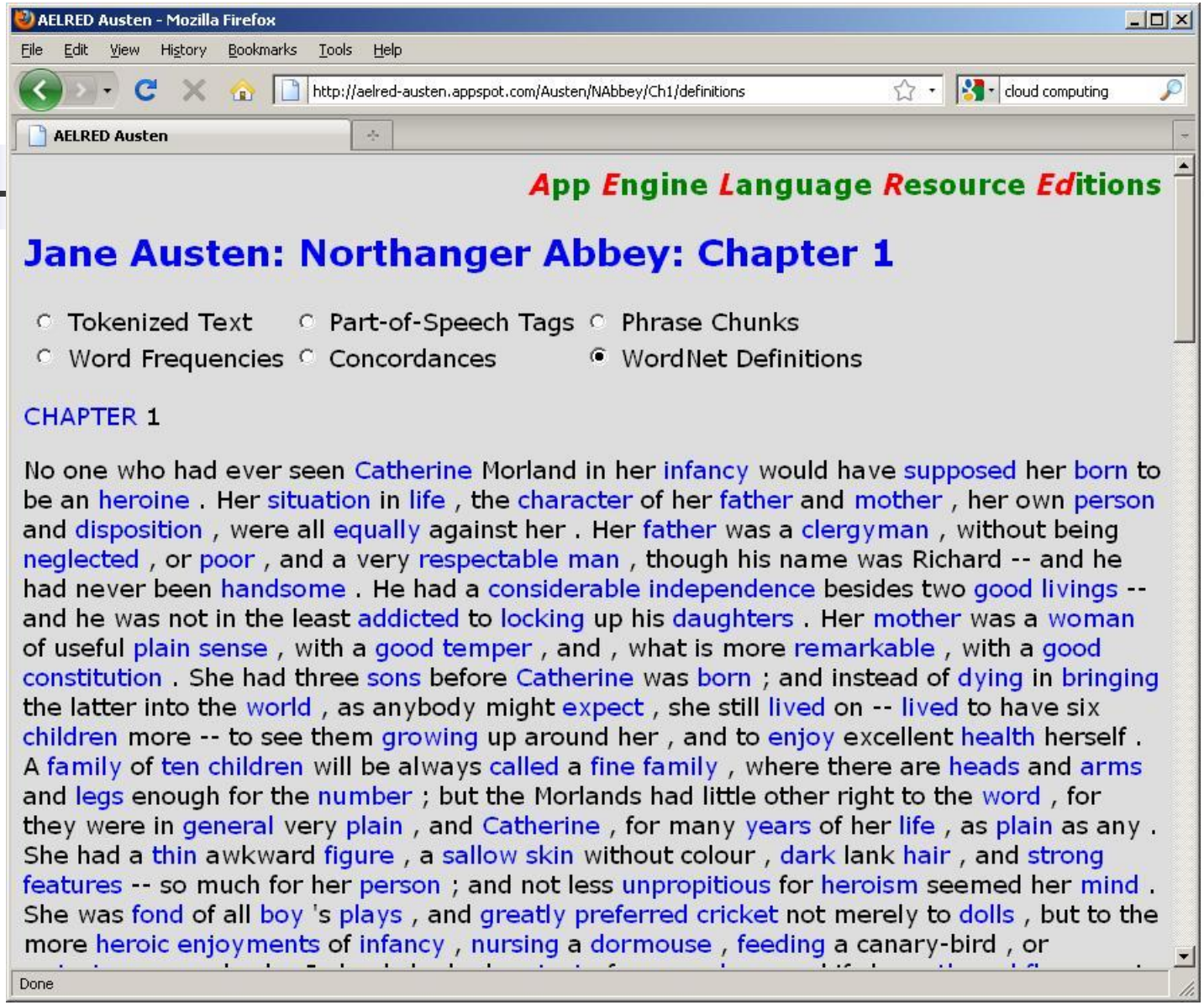
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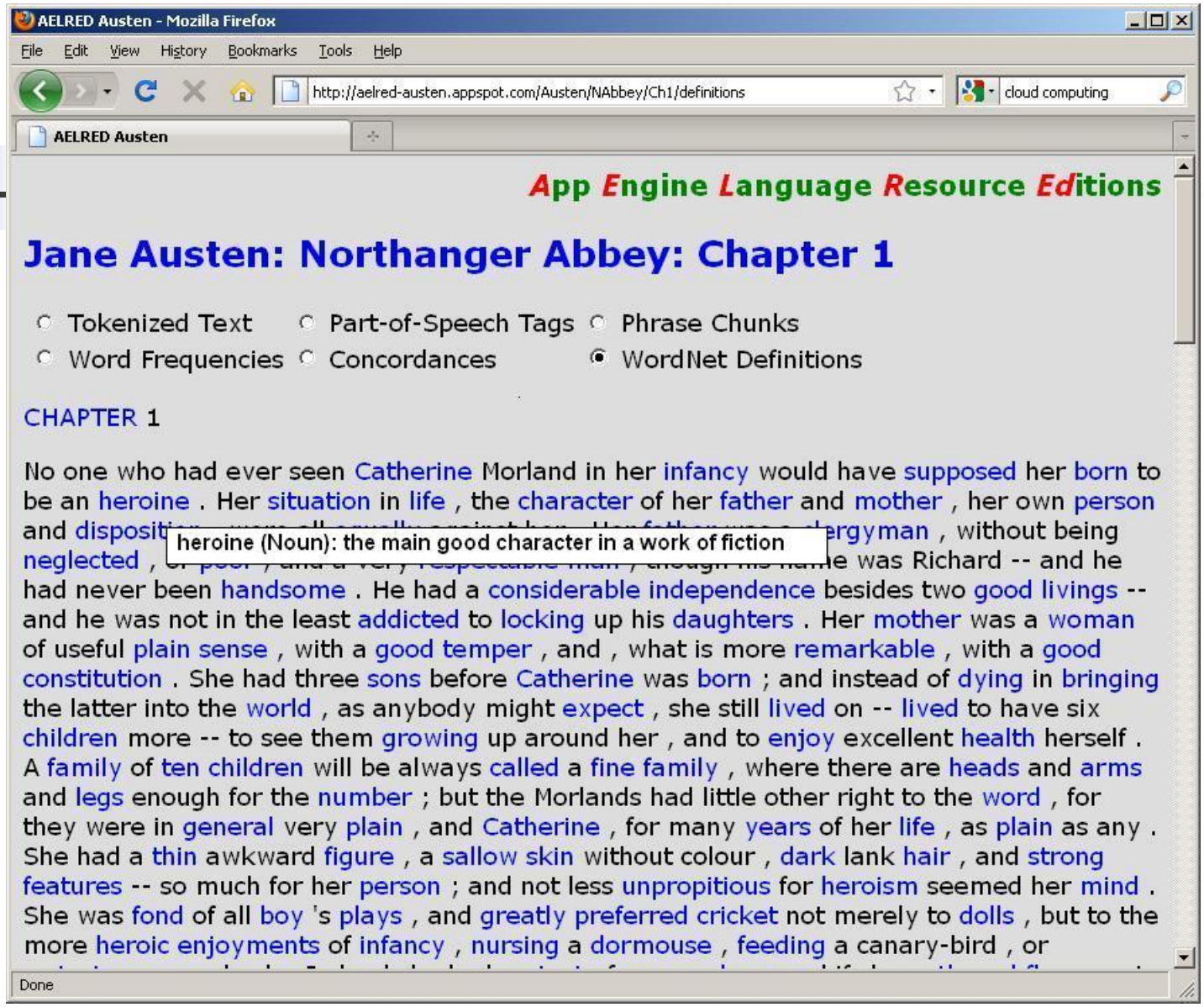
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heroine (Noun): the main good character in a work of fiction
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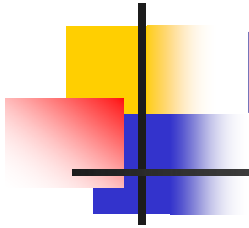
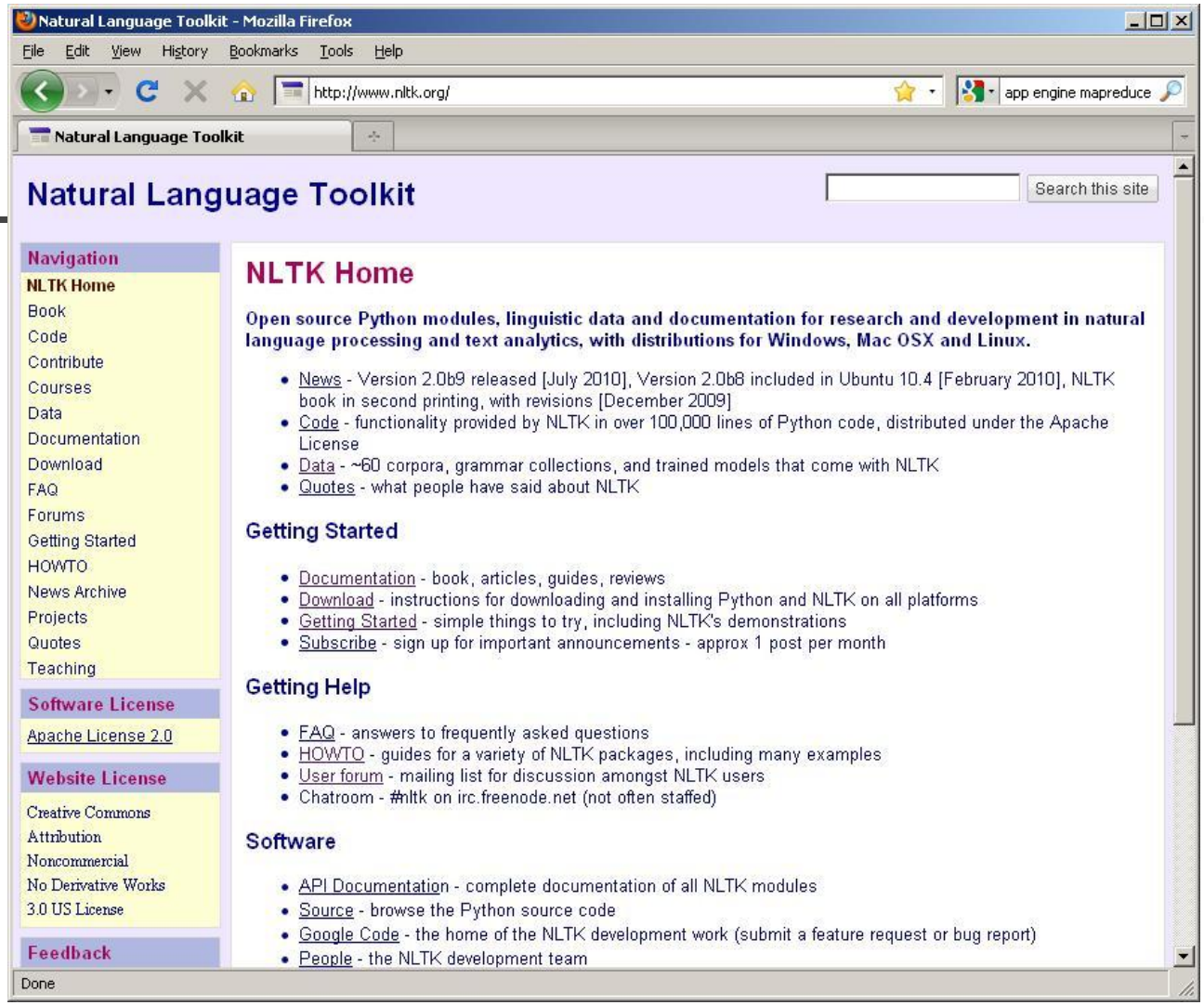


Key Ideas: Easy, Big, Free

- Easy: use Python
  - NLTK Natural Language Toolkit
  - Django HTML Template Engine
- Big: Google's scalable infrastructure
  - BigTable non-relational datastore
  - MapReduce data-intensive processing
- Free: App Engine has free quotas
  - Only pay if high demand for app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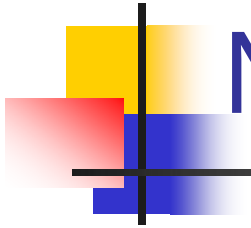
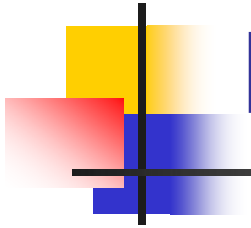
Open source Python modules, linguistic data and documentation for research and development in natural language processing and text analytics, with distributions for Windows, Mac OSX and Linux.
News - Version 2.0b9 released [July 2010], Version 2.0b8 included in Ubuntu 10.4 [February 2010], NLTK book in second printing, with revisions [December 2009]
Code - functionality provided by NLTK in over 100,000 lines of Python code, distributed under the Apache License
Data - ~60 corpora, grammar collections, and trained models that come with NLTK
Quotes - what people have said about NLTK
Getting Started
Documentation - book, articles, guides, reviews
Download - instructions for downloading and installing Python and NLTK on all platforms
Getting Started - simple things to try, including NLTK's demonstrations
Subscribe - sign up for important announcements - approx 1 post per month
Getting Help
FAQ - answers to frequently asked questions
HOWTO - guides for a variety of NLTK packages, including many examples
User forum - mailing list for discussion amongst NLTK users
Chatroom - #nltk on irc.freenode.net (not often staffed)
Software
API Documentation - complete documentation of all NLTK modules
Source - browse the Python source code
Google Code - the home of the NLTK development work (submit a feature request or bug report)
People - the NLTK development team
Done



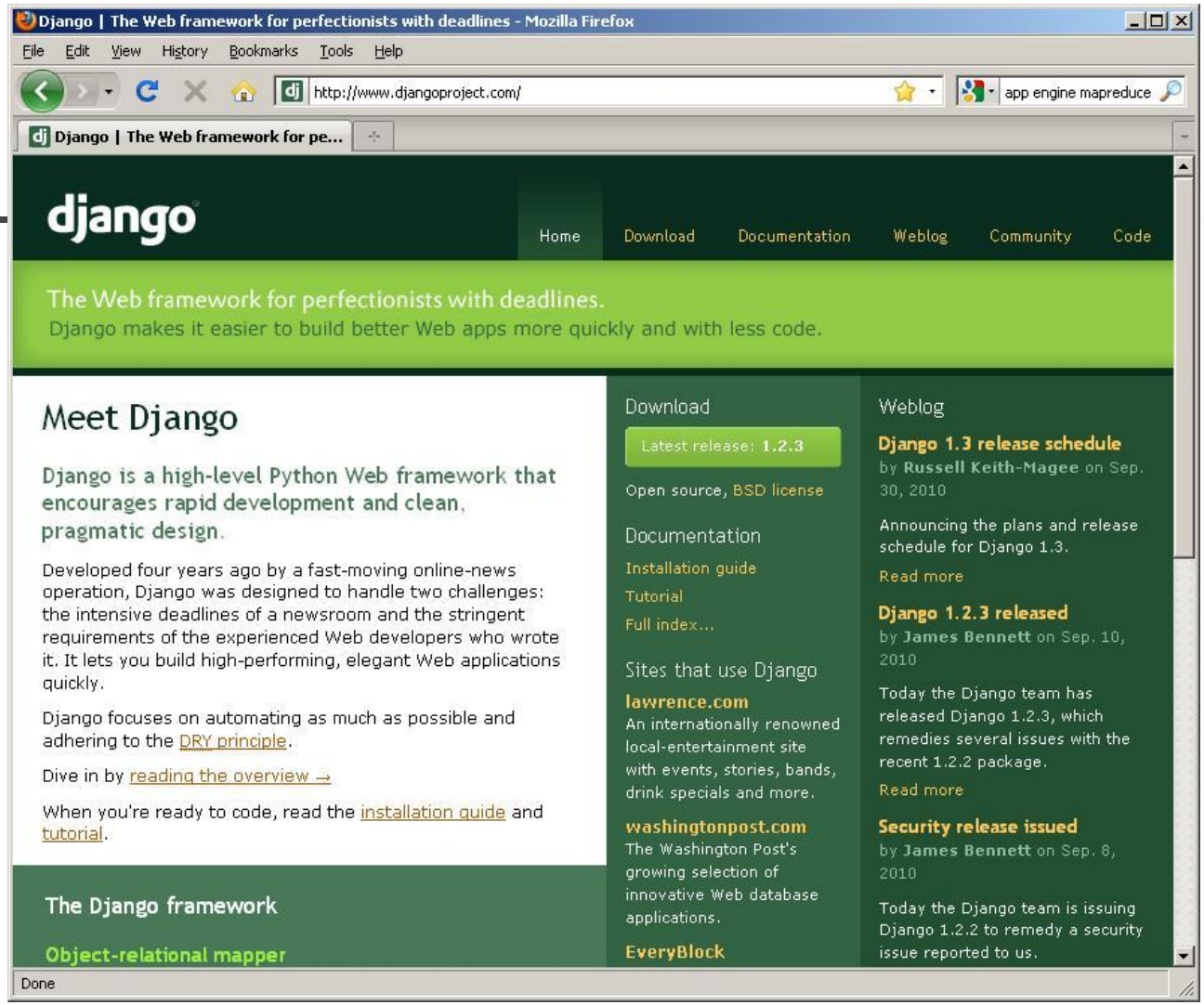
NLTK Natural Language Toolkit

- Open source Python tools
  - Taggers, chunkers, parsers, classifiers ...
- Many major corpora and resources
  - Brown Corpus, Penn Treebank, WordNet ...
- Excellent free online textbook
  - *Natural Language Processing with Python*
  - Stephen Bird, Ewan Klein, Edward Loper



NLTK and App Engine

- App Engine code must be pure Python
- Normal ”import nltk” does not work
  - Some NLTK code is not pure Python
  - E.g. uses Numpy with C for speed
- Use ”import aelred” instead
  - Aelred code is pure Python
  - Other customization, e.g. tokenization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The Web framework for perfectionists with deadlines.
Django makes it easier to build better Web apps more quickly and with less code.
Meet Django
Django is a high-level Python Web framework that encourages rapid development and clean, pragmatic design.
Developed four years ago by a fast-moving online-news operation, Django was designed to handle two challenges: the intensive deadlines of a newsroom and the stringent requirements of the experienced Web developers who wrote it. It lets you build high-performing, elegant Web applications quickly.
Django focuses on automating as much as possible and adhering to the DRY principle.
Dive in by reading the overview →
When you're ready to code, read the installation guide and tutorial.
The Django framework
Object-relational mapper
Download
Latest release: 1.2.3
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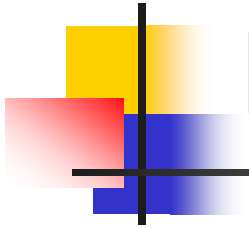
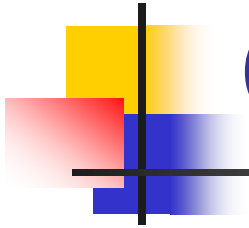
Sites that use Django
lawrence.com
An internationally renowned local-entertainment site with events, stories, bands, drink specials and more.
washingtonpost.com
The Washington Post's growing selection of innovative Web database applications.
EveryBlock
Weblog
Django 1.3 release schedule
by Russell Keith-Magee on Sep. 30, 2010
Announcing the plans and release schedule for Django 1.3.
Read more
Django 1.2.3 released
by James Bennett on Sep. 10, 2010
Today the Django team has released Django 1.2.3, which remedies several issues with the recent 1.2.2 package.
Read more
Security release issued
by James Bennett on Sep. 8, 2010
Today the Django team is issuing Django 1.2.2 to remedy a security issue reported to us.
Done



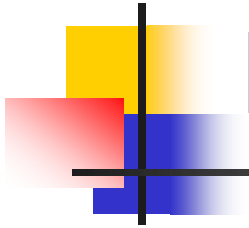
Django Web App Framework

- Open source Python
  - Model-View-Controller design pattern
  - Models defined easily by Python classes
- HTML Template Engine
  - Web pages generated using contexts
  - Excellent ”template inheritance” facility
- Free online textbook
  - *Django: The Book*



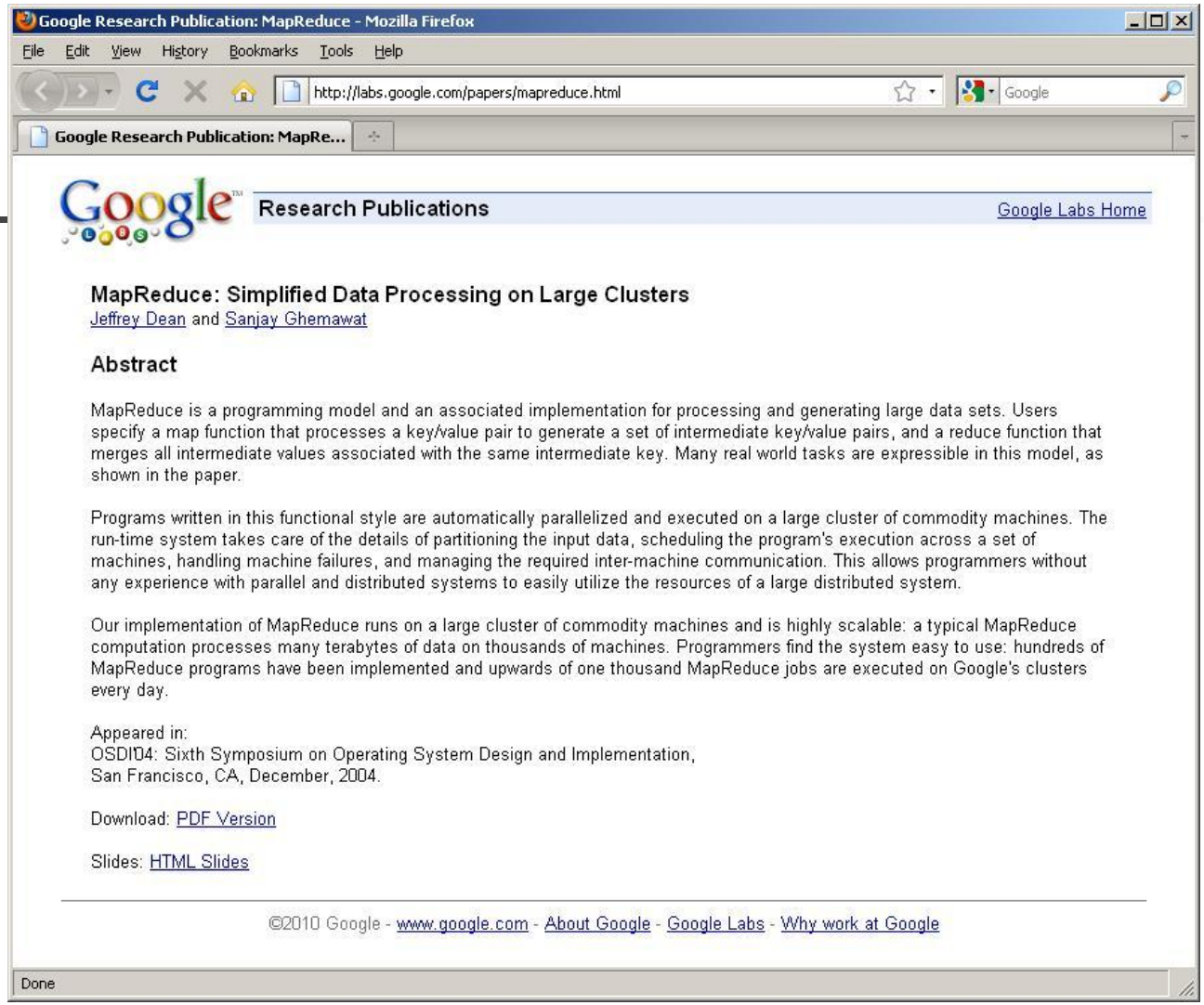
Google BigTable Datastore

- Non-relational database
  - Different thinking from SQL databases
  - Designed for massive scalability
- My current way of using the datastore:
  - Serialize complex objects to YAML
  - Store/retrieve YAML as big text strings



MapReduce Algorithms

- Data-intensive distributed processing
  - Different thinking from usual algorithms
  - Designed for massive scalability
- My current way of using MapReduce:
  - Iterate over all entities in datastore
  - Delete entity, or update and save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MapReduce: Simplified Data Processing on Large Clusters
Jeffrey Dean and Sanjay Ghemawat
Abstract
MapReduce is a programming model and an associated implementation for processing and generating large data sets. Users specify a map function that processes a key/value pair to generate a set of intermediate key/value pairs, and a reduce function that merges all intermediate values associated with the same intermediate key. Many real world tasks are expressible in this model, as shown in the paper.
Programs written in this functional style are automatically parallelized and executed on a large cluster of commodity machines. The run-time system takes care of the details of partitioning the input data, scheduling the program's execution across a set of machines, handling machine failures, and managing the required inter-machine communication. This allows programmers without any experience with parallel and distributed systems to easily utilize the resources of a large distributed system.
Our implementation of MapReduce runs on a large cluster of commodity machines and is highly scalable: a typical MapReduce computation processes many terabytes of data on thousands of machines. Programmers find the system easy to use: hundreds of MapReduce programs have been implemented and upwards of one thousand MapReduce jobs are executed on Google's clusters every day.
Appeared in:
OSDI'04: Sixth Symposium on Operating System Design and Implementation,
San Francisco, CA, December, 2004.
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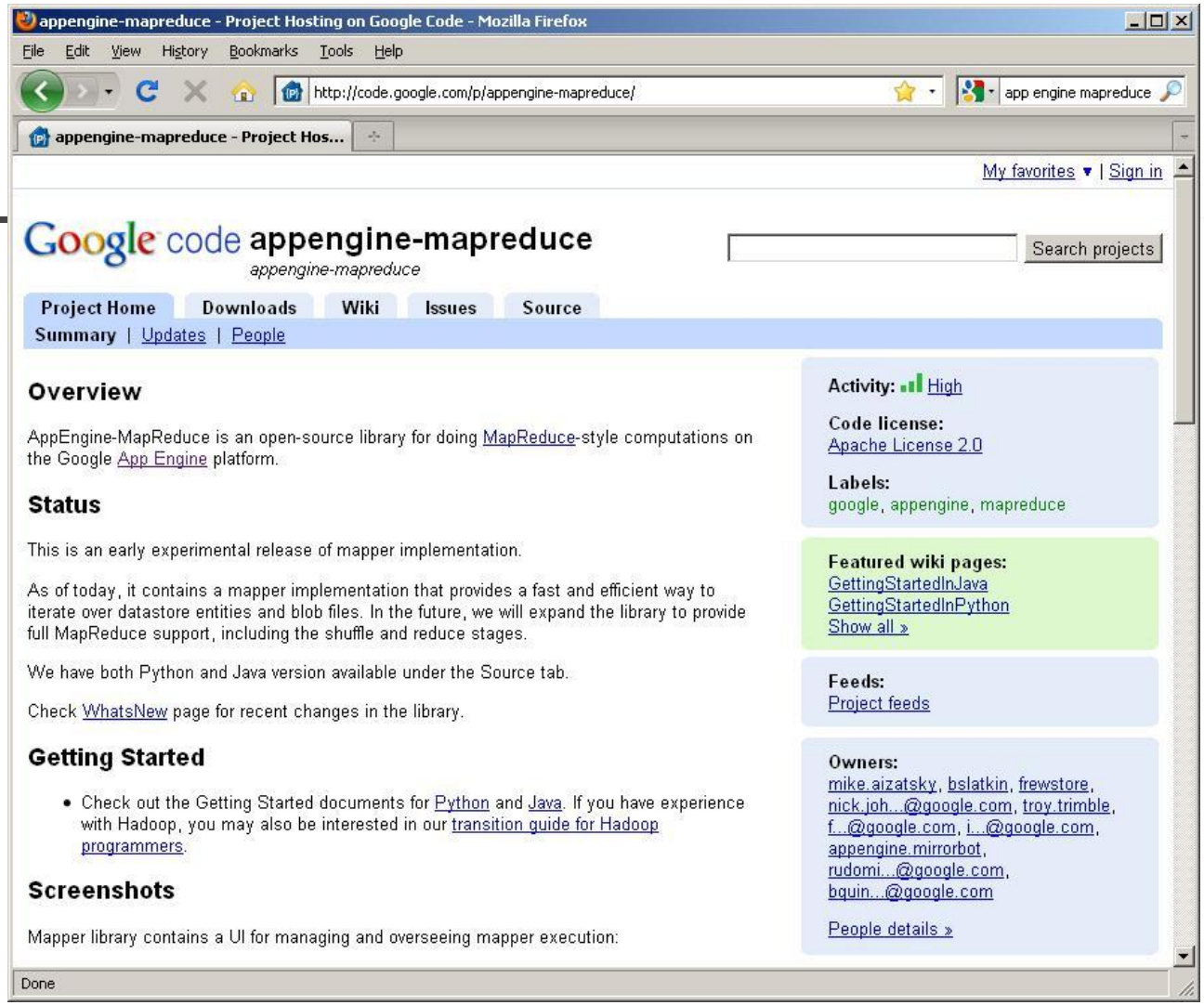
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Overview
AppEngine-MapReduce is an open-source library for doing MapReduce-style computations on the Google App Engine platform.
Status
This is an early experimental release of mapper implementation.
As of today, it contains a mapper implementation that provides a fast and efficient way to iterate over datastore entities and blob files. In the future, we will expand the library to provide full MapReduce support, including the shuffle and reduce stages.
We have both Python and Java version available under the Source tab.
Check WhatsNew page for recent changes in the library.
Getting Started
Check out the Getting Started documents for Python and Java. If you have experience with Hadoop, you may also be interested in our transition guide for Hadoop programmers.
Screenshots
Mapper library contains a UI for managing and overseeing mapper execution:
Activity: High
Code license:
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Labels:
google, appengine, mapreduce
Featured wiki pages:
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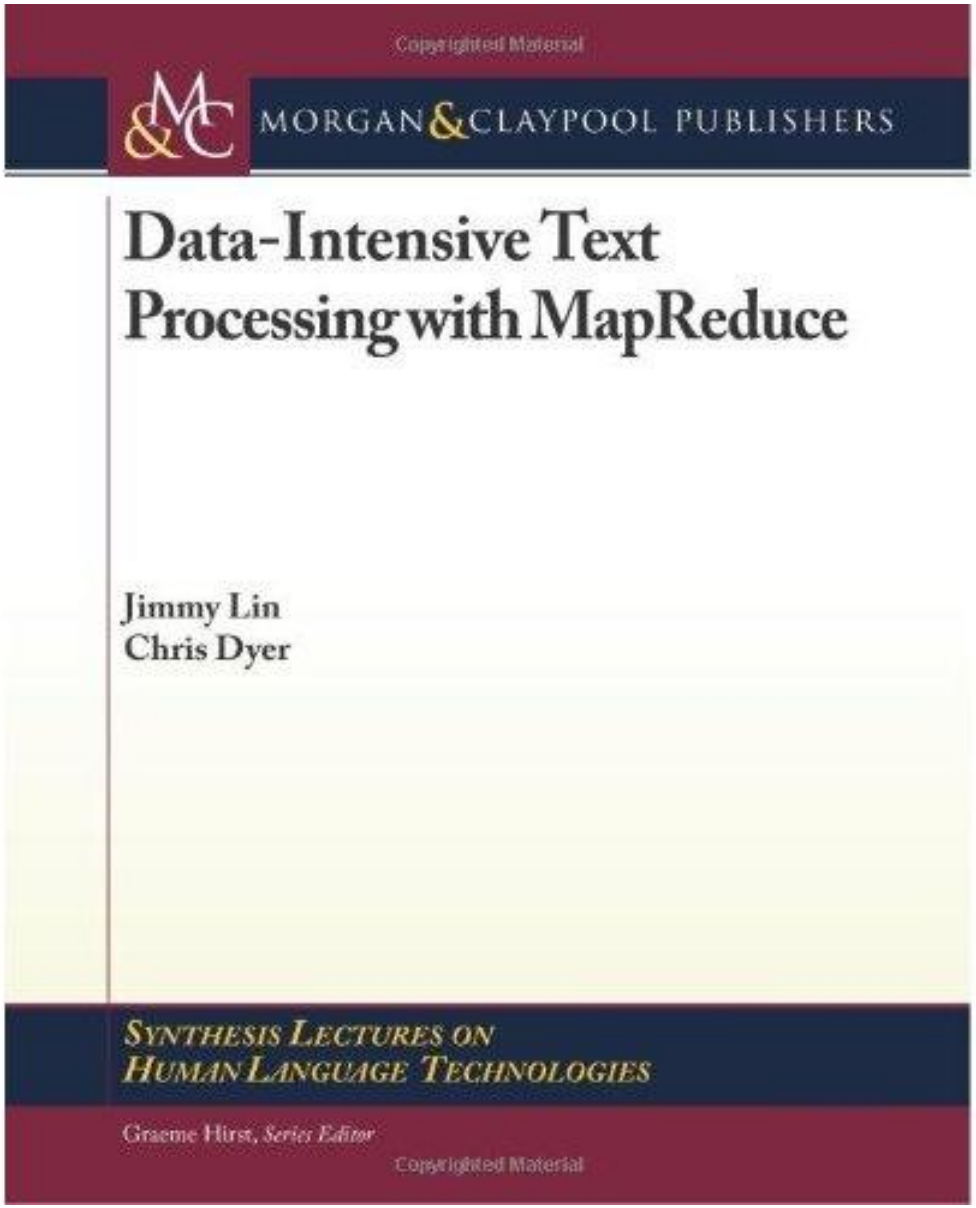
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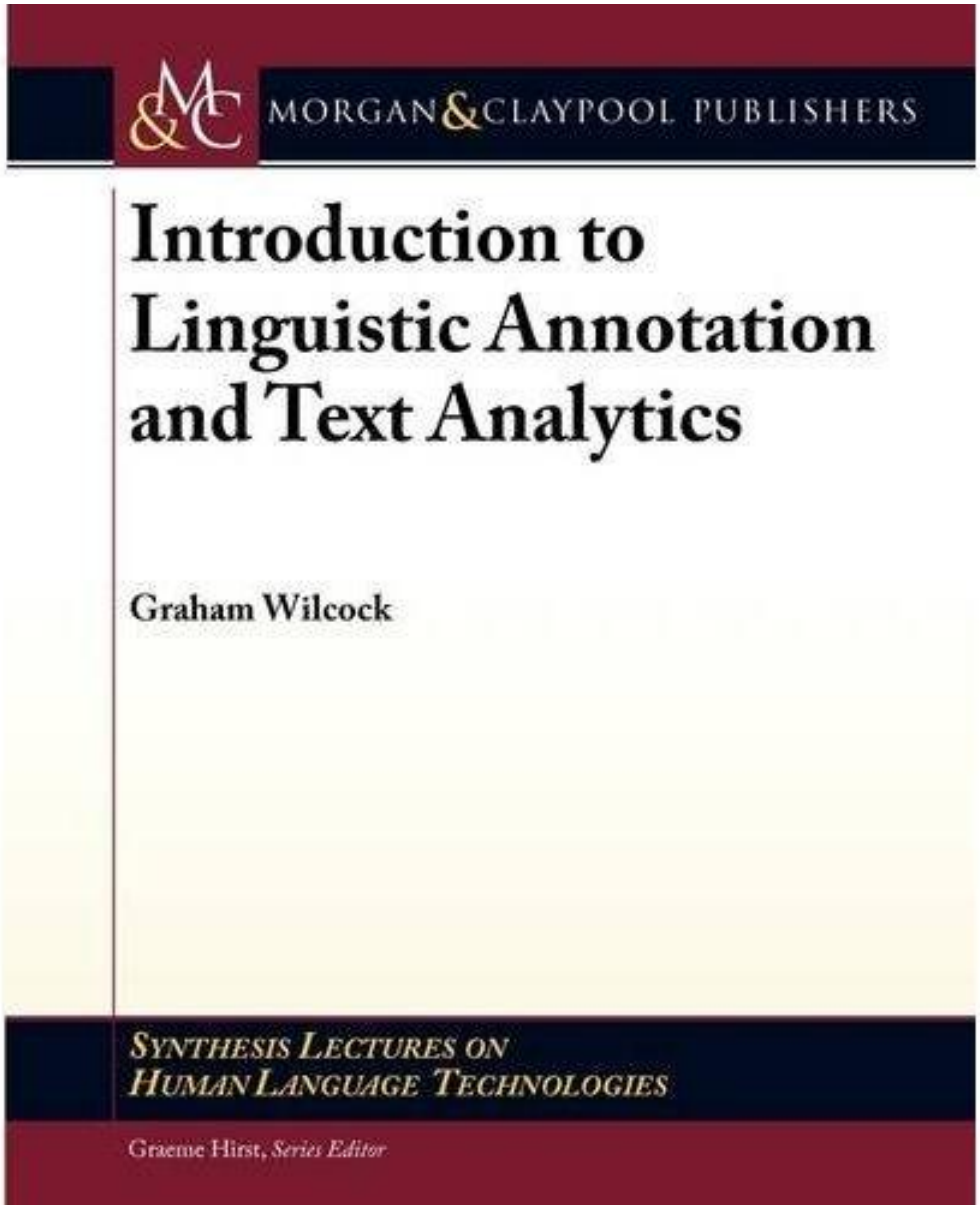
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