Class 01: Getting started

September 7, 2017

Why are you taking this course?

Either:

- You don't know programming but are eager to learn, or
- It's a requirement for your degree

Good news!

- Programming is fun
- Programming improves all aspects of human experience
- Programming will make your life easier

More good news!

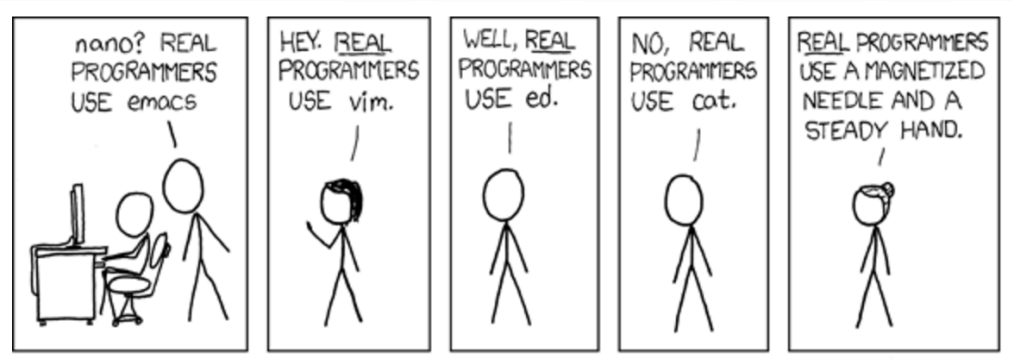
- All the examples in this course are based on linguistic problems

Prerequisites

Stuff you need before you begin:

- A UNIX-compatible system (GNU/Linux, *BSD, Mac/OS)
- A text editor
- An installation of Python – Python 3.0 or higher!

How to choose a text editor:



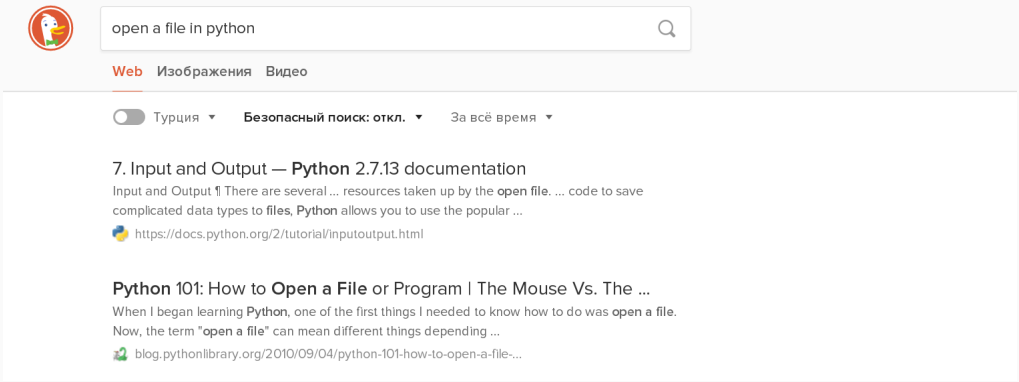
Honestly, use something other people (programmers) you know use.

Argh but what if I have Windows™

I have no idea about Windows

To be safe, install a Virtual Machine (e.g. VirtualBox) and a flavour of GNU/Linux, e.g. Ubuntu.

How to get help



On your own:

- A search engine such as Google™, Yandex™ or DuckDuckGo™
- The fine Python documentation: `http://docs.python.org`
- Internet Relay Chat: `http://webchat.freenode.net`
- Stack Overflow: `https://stackoverflow.com`

Ask me:	In class, 518 or in the corridor	(IRL)
	`#hseling` on `irc.freenode.net`	(IRC)
	`https://vk.com/id138461818`	(VK)
	`francis.tyers@gmail.com`	(Hangouts)

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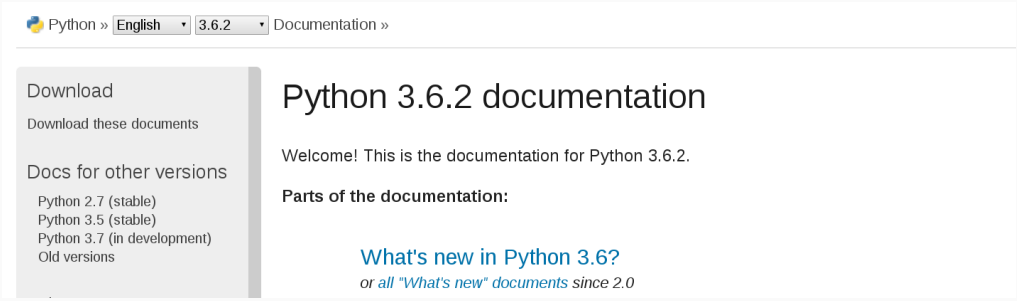

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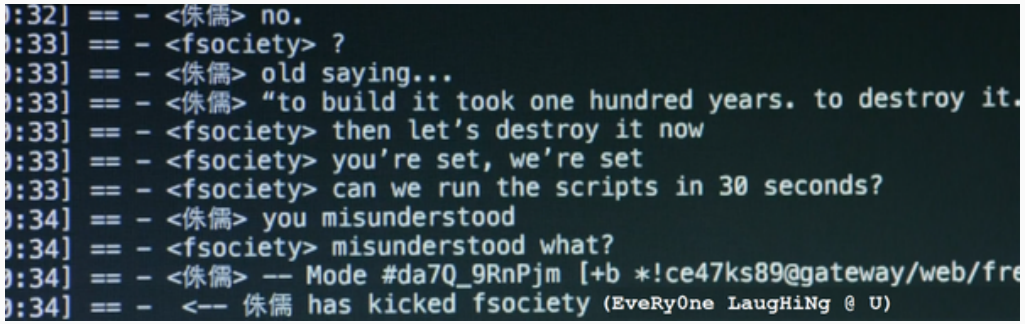

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Structure of the course

`https://ftyers.github.io/079-osnov-programm/index.html`

Class	Topic	Class	Topic
1	Command line	7	*Project work*
2	Segmenter	8	*Project work*
3	Tokeniser	9	*Project work*
4	Transliterator	10	*Project work*
5	Language model	11	*Project work*
6	Tagger	12	*Presentations*

Pipeline

A typical basic NLP pipeline looks like the following:

```
sentence segmenter | tokeniser | tagger | parser
```

- segmenter: takes a paragraph and gives sentences
- tokeniser: takes a sentence and gives list of tokens
- tagger: gives every token a morphosyntactic tag
- parser: takes a tagged sentence and gives a parse tree

During the first six classes you will be implementing basic versions of the first three modules.

Projects

For the remaining six classes you will work on:

- A small software project
- Something that you are excited about

For inspiration, you could:

- Perform some quantitative linguistic experiment
- Implement a program to convert between formats
- Write a *scraper* for some online language data
- Implement a simple machine learning solution to a problem

You will need to decide by the 5th class, if you are unsure, talk to me

Marking scheme

Details on the course page.

Marking

- 40% Project
- 10% Exam
- 20% Practicals
- 20% Homework
- 10% Active participation

Project: The project will encompass all of the class work and homework for the last six classes. You should start thinking from the first class what you might be interested in working on. If you cannot come up with any ideas, then I will give a number of options, or come and talk to me. The project should be substantial and test and expand your knowledge in some way. It should contain an evaluation component, either for efficiency of implementation or in terms of accuracy for some task. It will include a short (maximum ten minute) presentation to be done on the last day of class. One of the most important aspects of programming is learning to use the computer to *scratch an itch* `удовлетворить личное желание' the project will ensure you are able to do that.

Exam: There will be a short exam to test you on what you have learnt in the course. There will be a number of multiple choice questions and a programming assignment to complete on paper. As programming is a subject that is more suited to practical evaluation the exam has a concomitantly low contribution to your final mark.

Practicals: Most of the course will be made up of practical sessions. I will evaluate your progress after each session.

Homework: Homework will be submitted through Github, and will need to be completed before the following lesson. Your Github repository should be called `2017-osnov_programm` and have the following subdirectories: `corpus` for your (sub-)corpus from Wikipedia, and `project` for your project work.

Active participation: Beyond simply showing up, I encourage you to contribute to discussions by asking questions, answering questions, making relevant comments, helping classmates and asking for help with in-class activities, etc. There are no stupid questions — I want to make sure everyone grasps the concepts, and many are not as straightforward as they may first seem (or as I think they are). You are also expected to have read any assigned readings before class.

tl;dr Most of the final mark is from the class work and project.

What we are going to do today

First things first:

- Make sure you have Python installed
- Set up Github accounts
- Install a text editor
- Work with the shell

Then second things:

- Choose a language
  - For purposes of speed, choose one with $<= 500,000$ articles
- Download the Wikipedia in that language
- Extract the text from Wikipedia

Check your Python installation

Open a terminal and type `python3` and press return ⏎ .

```
$ python3
Python 3.5.2+ (default, Aug  5 2016, 08:07:14)
[GCC 6.1.1 20160724] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

If you don't have Python installed, install it now.

Github

All practical work will be stored and submitted through GitHub.

If you don't already have an account:

- Go to `https://github.com/join`
- Fill in the information
- Click "Create an account"
- Choose "Unlimited public repositories for free."
- Skip the next part.

Setup the directory structure

In your browser:

- First make a repository, call it `2017-osnov-programm`
- Choose 'Initialise this repository with a README'
- Click 'Clone or download' and copy the link

In the terminal:

```
$ git clone https://github.com/XXXXXX/2017-osnov-programm.git

$ cd 2017-osnov-programm

$ mkdir corpus project
```

Where XXXXXX is your GitHub username.

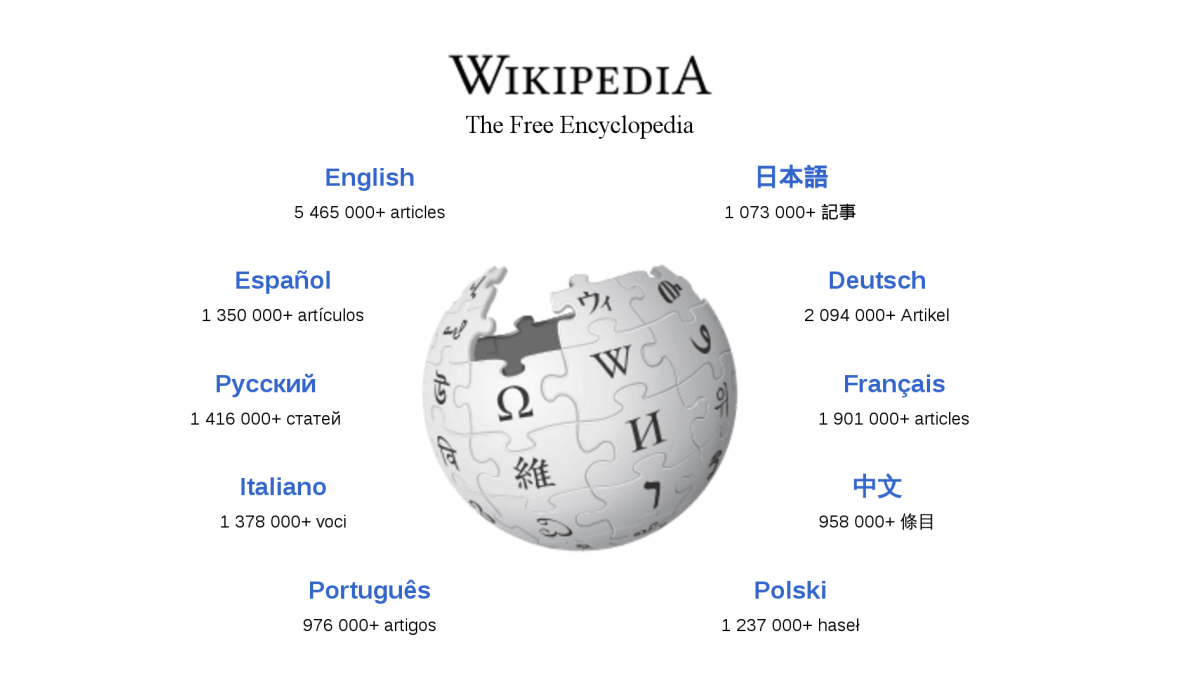
Text editor

There are about 100500 text editors ...
I tried to get a definitive answer on which is the best text editor by asking your fellow students I know which one they use ...

- Sublime: +++
- TextWrangler: +
- Vim: +
- Atom: +
- Notepadpp: +
- Emacs:

Unfortunately there were nearly as many favourites as students ...

Wikipedia as a corpus/1



Wikipedia makes a great[1] corpus:

- Free to use and distribute
- Very many languages – 295 at the last count

[1] Well, great in some respects

文A Read Wikipedia in your language ^

1 000 000+

Deutsch
English
Español
Français
Italiano
Nederlands
日本語
Polski
Русский
Sinugboanong Binisaya
Svenska
Tiếng Việt
Winaray

100 000+

العربية
Azərbaycanca
Български
Bân-lâm-gú / Hō-ló-oē
Беларуская (Акадэмічная)
Català
Čeština
Dansk
Eesti
Ελληνικά
Esperanto
Euskara
فارسی
Galego
한국어
Հայերեն
हिन्दी
Hrvatski
Bahasa Indonesia
עברית
ქართული
Latina
Lietuvių
Magyar
Bahasa Melayu
Bahaso Minangkabau
Norsk (Bokmål · Nynorsk)
Нохчийн
Oʻzbekcha / Ўзбекча
Português
Қазақша / Qazaqşa / قازاقشا
Română
Simple English
Slovenčina
Slovenščina
Српски / Srpski
Srpskohrvatski / Српскохрватски
Suomi
தமிழ்
ภาษาไทย
Türkçe
Українська
اردو
Volapük
中文

10 000+

Afrikaans
Alemannisch
አማርኛ
Aragonés
Asturianu
বাংলা
Basa Banyumasan
Башҡортса
Беларуская (Тарашкевіца)
বিষ্ণুপ্রিয়া মণিপুরী
Boarisch
Bosanski
Brezhoneg
Чӑвашла
Føroyskt
Frysk
Gaeilge
Gàidhlig
ગુજરાતી
Hornjoserbsce
Ido
Ilokano
Interlingua
Ирон æвзаг
Íslenska
Jawa
□□□□□
Kreyòl Ayisyen
Kurdî / كوردی
کوردیی ناوەندی
Кыргызча
Кырык Мары
Latviešu
Lëtzebuergesch
Limburgs
Lumbaart
मैथिली
Македонски
Malagasy
മലയാളം
मराठी
მარგალური
مصرى
مازِرونی
Mìng-dĕ̤ng-ngṳ̄
Монгол
□□□□□□□□□□
नेपाल भाषा
नेपाली
Nnapulitano
Occitan
ଓଡ଼ିଆ
ਪੰਜਾਬੀ (ਗੁਰਮੁਖੀ)
پنجابی (شاہ مکھی)
Piemontèis
Plattdüütsch
Runa Simi
Cymraeg
संस्कृतम्
Саха Тыла
Scots
Shqip
Sicilianu
සිංහල
Basa Sunda
Kiswahili
Tagalog
Татарча / Tatarça
తెలుగు
Тоҷикӣ
تۆرکجه
ᨅᨔ ᨕᨘᨁᨗ / Basa Ugi
Vèneto
Walon
ייִדיש
Yorùbá
粵語
Žemaitėška

1 000+

Bahsa Acèh
Адыгэбзэ
Ænglisc
Аԥсуа
Armãneashce
Arpitan
ܐܪܡܝܐ
Avañe'ẽ
Авар
Aymar
Bahasa Banjar
भोजपुरी
Bikol Central
Bislama
བོད་ཡིག
Буряад
Chavacano de Zamboanga
Corsu
Cuengh
Deitsch
ދިވެހިބަސް
Diné Bizaad
Dolnoserbski
Emigliàn–Rumagnòl
Эрзянь
Estremeñu
Fiji Hindi
Furlan
Gaelg
Gagauz
Gĩkũyũ
گیلکی
贛語
Hak-kâ-fa / 客家語
Хальмг
Hausa / هَوُسَ
ʻŌlelo Hawaiʻi
Igbo
Interlingue
Kalaallisut
Kapampangan
Kaszëbsczi
Kernewek
□□□□□□□□□□
Kinyarwanda
Коми
Kongo
कोंकणी / Konknni
ພາສາລາວ
Dzhudezmo / לאדינו
Лакку
Лезги
Líguru
Lingála
lojban
لۊری شومالی
Luganda
Malti
文言
Reo Mā'ohi
Māori
Mirandés
Мокшень
Nāhuatlahtōlli
Dorerin Naoero
Nedersaksisch
Nordfriisk
Nouormand / Normaund
Novial
Олык Марий
অসমীয়া
पालि
Pangasinán
Papiamentu
پښتو
Перем Коми
Pfälzisch
Picard
Къарачай–Малкъар
Qaraqalpaqsha
Qırımtatarca
Ripoarisch
Rumantsch
Русиньскый Язык
Sámegiella
Sardu
Seeltersk
Sesotho sa Leboa
ChiShona
سنڌي
Ślůnski
Soomaaliga
Sranantongo
Taqbaylit
Tarandíne
Tetun
Tok Pisin
faka Tonga
Türkmençe
Тыва дыл
Удмурт
ئۇيغۇرچە
Vepsän
Võro
West-Vlams
Wolof
吳語
Zazaki
Zeêuws

100+

Akan
Bamanankan
Chamoru
Chichewa
Eʋegbe
Fulfulde
𐌲𐌿𐍄𐌹𐍃𐌺
ᐃᓄᒃᑎᑐᑦ / Inuktitut
Iñupiak
كشميري
Latgaļu
Молдовеняскэ
Na Vosa Vaka-Viti
Nēhiyawēwin / ᓀᐦᐃᔭᐍᐏᐣ
Norfuk / Pitkern
Afaan Oromoo
Ποντιακά
རྫོང་ཁ
Romani
Kirundi
Gagana Sāmoa
Sängö
Sesotho
Setswana
Словѣньскъ / ⰔⰎⰑⰂⰡⰐⰠⰔⰍⰟ
SiSwati
ትግርኛ
ᏣᎳᎩ
Tsėhesenėstsestotse
Tshivenḓa
Xitsonga
chiTumbuka
Twi
isiXhosa
isiZulu

Other languages · **Weitere Sprachen** · **Autres langues** · **Kompletna lista języków** · **他の言語** · **Otros idiomas** · **其他語言** · **Другие языки** · **Aliaj lingvoj** · **다른 언어** · **Ngôn ngữ khác**

Not on Wikipedia: Ainu, Chukchi, Dargwa, Khanty, Udi

Adyghe · Avar · Bambara · Bashkir · (Berber) · Breton · Chuvash · (East Caucasian) · Finnish · Hungarian · Kabyle · (Khoisan) · Komi · Lezgian · (Mande) · Mari · Mordvin · Rusyn · (Slavic) · Tatar · Udmurt · Yiddish

Too big: ?English · ?French · ?German · ?Italian · ?Japanese · ?Polish · ?Russian · ?Spanish

Wikipedia as a corpus/3

Deliberately vague steps:

- Use your search engine to find where Wikipedia keeps its ‘dumps’.
- Find the language code of the language you are interested in
- Download the dump for the language you are interested in
  - Tip 1: You’re looking for a ‘Database backup dump’
  - Tip 2: The filename will include `pages-articles.xml.bz2`
- Find WikiExtractor on the Apertium Wiki
- Run WikiExtractor on the dump file you downloaded.