

TA Introductory Session

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Python

<https://www.python.org/downloads/>

Jupyter

<https://jupyter.org/>

Google colab

https://colab.research.google.com/?utm_source=scs-index#scrollTo=C4HZx7Gndbrh

NetworkX

https://networkx.org/documentation/stable/_downloads/networkx_reference.pdf

<https://networkx.org/documentation/stable/tutorial.html>

Coding standards

- Coding standards are guidelines for code style and documentation.
- They may be formal (IEEE) standards, or company specific standards.
- The aim is that everyone in the organization will be able to read and work on the code.
- Coding standards cover a wide variety of areas:
 - Program design
 - Naming conventions
 - Formatting conventions
 - Documentation
 - Use (or not) of language specific features

- **Why bother with a coding standard?**
 - Consistency between developers
 - Ease of maintenance and development
 - Readability, usability
- Example should make this obvious!
- No standard is perfect for every application.
 - If you deviate from the standard for any reason,
document it!

Coding style

- There are several examples of coding styles. Often they

differ from company to company

- They typically have the following in common:

- Names

- Use full English descriptors
- Use mixed case to make names readable
- Use abbreviations sparingly and consistently
- Avoid long names
- Avoid leading/trailing underscores

- Documentation

- Document the purpose of every variable
- Document why something is done, not just what

Coding style

- Accessors

- Use getX(), setX() functions on all class variables.

- Member function documentation

- What & why member function does what it does

- Parameters/return value

- How function modifies object

- Preconditions/postconditions

- Concurrency issues

- Restrictions

- Document why the code does things as well as what

it does.

Standards

- Standards are documented agreements containing technical specifications or other precise criteria to be used consistently as guidelines, rules, or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose.
- International standards are supposed to contribute to making life simpler, and to increasing reliability and effectiveness of the goods and services we use.
- Standards represent best, or most appropriate, practice:
 - They encapsulate historical knowledge often gained through trial and error.
 - They preserve and codify organizational knowledge and memory
 - They provide a framework for quality assurance.
 - Ensure continuity over a project's lifecycle.

Standards

- There are many industry standards governing all aspects of software development:
 - Terminology
 - Notation
 - Requirements gathering
 - Design
 - Coding
 - Documentation
 - Human computer interaction
 - Verification and validation
 - Quality assurance
 - Even ethics!

Who writes standards?

- ISO

International Organization for

Standardization

- SAA

Standards Australia

- BSI

British Standards Institute

- ANSI

American National Standards Institute

- IEEE

Institute for Electronic and Electrical

Engineers

- And about 80 or so others!

Relevant standards

- ISO 646 – 7-bit ASCII with national variants
- ISO 8859 – several 8-bit ASCII extensions:
 - ISO 8859-1: West European languages (Latin-1)
 - ISO 8859-2: East European languages (Latin-2)
 - ISO 8859-5: Latin/Cyrillic
- ISO 6429 – ASCII control codes
- ISO 2382 – Information technology vocabulary
- ISO 8652 – the Ada programming language
- ISO 9899 – the C programming language
- ISO 9660 – CD-ROM volume and file structure
- ISO 3166 – codes for the representation of names of countries:
 - Defines a 2-letter, 3-letter and numeric code for every country.
 - US/USA/840 = United States
 - GB/GBR/826 = United Kingdom
- The 2-letter codes are well known as the internet top level domain names.