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Seminar session – Unit 4

Software Engineering Project Management – Data Structures

(seminar is being recorded)

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Outline

- Announcements
- The importance of …..
- Python and Data
- Seminar 3 reading and questions
- QA & Next Week

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Announcements

- Forums and Posts
- Requirements
- "Customer Meeting"

Announcements

- The nature of the product (the toy)
- 3 options:
  - Customer has clear idea/model of the product in mind; shares it with the dev team and uses it to select appropriate requirements
  - Customer has clear idea/model of the product in mind; BUT DOES NOT share it with the dev team but uses it to select appropriate requirements
  - Customer does NOT have a clear idea/model/ consensus of the product in mind; selects appropriate requirements based on stakeholder views.

The importance of ...

- Data Structures
  - Why worry?
  - Mapping HL language and structures onto LL hardware
    - e.g. How does CPU handle string, float, boolean?
  - Mapping external data onto HL structures
    - e.g. How does HLL handle NoSQL data (JSON)?
- External Structures (examples)
  - Flynn's Taxonomy (1966) (SISD, SIMD, MISD, MIMD)
    - Single Instruction Single Data, Multiple Data, Multiple Instruction Single Data, Multiple Data
    - *SIMD - Most CPUs have SIMD HW but may need data 'munging'*
    - *MIMD - Parallel systems may require explicit hints for code/data*
  - NoSQL – *key-value pairs*
  - Trees and Graphs – *Why use? How to search?*

Python and Data

- Python has mutable and immutable data types – why?
  - Strings, Integers, floats, boolean
  - Lists (queues, stacks)
  - Sets
  - Dictionaries
  - Where does a hash table fit?
- Python extensions
  - SWIG – interface to C and C++ programs (why?)
  - Interface to different paradigms – meta languages, domains, etc.
- Examples
  - Maude
  - SciPy

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Seminar 3: Reading & Questions

Additional reference: Hug, N., (2020). Surprise: A Python library for recommender systems. Journal of Open Source Software, 5(52), 2174, https://doi.org/10.21105/joss.02174

Seminar Exercise:

Visit python.org (n.d.), and any other relevant sources of information that you may find useful to support this task.

- Select at least two different data structures to hold the data associated with the list of functional and non-functional requirements that you defined for Task 1.
- Justify your data structure choices.
- Select at least one academic paper, which might be similar to the work of Abeykoon et al. (2020).
- Use your sourced information to support your data structure choices.

Be prepared to share your chosen news article, your list of requirements and chosen data structure in the seminar.
What data structures did you use for the seminar exercise? Why?
How has this affected your design for your assessment?

Demo

- Student Groups:
  - Each group should describe one data structures they selected and explain why they selected those structures (with examples)

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Further Info & Questions

- Next session (unit 6): Read *Minge & Thuring* (2018) think about User Experience and human emotions.

- Office Hours: Weds 1 – 2 pm
- Fri 6 - 7pm

- Any questions?