ADS-MIRI Proposal of Homeworks and Final Projects
First Update

Amalia Duch and Conrado Martínez

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The Homeworks and Final Projects are not limited to the following proposals and or topics. Feel free to choose any other topic or data structure of your interest. In the case of the final Project do so with the agreement of ADS' coordinator.

It might be that a few things from the published documents: *ADS-MIRI: Proposal of Homeworks and Final Projects* and *ADS-MIRI: Grading*, will have to be adapted to the novel situation. For instance, it might happen that we have to forget about oral presentations, giving the option to deliver a video lecture.

Homeworks

A homework is a written document that includes:

- a short description of the data structure under study,
- its main features, an implementation of the data structure,
- the design of an experiment to show one of the features of the data structure
- a report of the results of executing the proposed experiment and
- some personal observations and or conclusions.

In case of doubt do not hesitate to ask, maybe using the new Slack channel `#projects`, or a direct Slack message or email to the professor supervising the project or homework.

0.1 Proposals from Amalia Duch's Lectures

- Show experimentally that the expected height of a randomly built binary search tree of n nodes is $\Theta(\log n)$.

- Red-Black trees
- Tim sort and Introspective sort
- k-d tries or quad tries.
- Segment trees.
- Priority search trees.
- Kinetic heap.
- Bisector trees.
- B trees.

0.2 Proposals from Contrado Martnez's Lectures

The lists below are still expanding, as we advance further in the course I expect to add a few more items.

- Cuckoo Hashing
- Coalesced Hashing
- Linear Probing (FCFS, LCFS, Ordered hashing, Robin Hood)
- Counting Bloom Filters
- ...

Final Projects

0.3 Proposals from Amalia Duch's Lectures

- Deletion in quad trees.
- Applications of octrees in computer graphics.
- Sweep lines.
- Fractional Cascading.
- The van Emde Boas Layout.
- Cache oblivious B trees.
- Succint data structures.

0.4 Proposals from Contrado Martnez's Lectures

The lists below are still expanding, as we advance further in the course I expect to add a few more items.

- Deletions in Open Addressing Hash Tables.
- Perfect Hashing & Dynamic Perfect Hashing.
- Applications & variants of Bloom Filters. Bloomier Filters.
- ...