Assignment 1: Computational complexity upper bound estimation

Part 1: upper bound estimation for AI models

- Pick any open-source (with access to implementation) modern AI model (e.g., llama3, mistral, stable diffusion).

- Break down the algorithm into components, and identify the **basic operation** for further analysis (i.e., comparison for sorting).

- Estimate the computational complexity of the model. Your solution should include:
    - A step-by-step breakdown of the algorithm with stages' complexity in Θ-**notation** (so, *precise* upper bound).
    - An explanation of block composition (answering "Why do I multiply/add complexity").
    - An overall estimation for the whole model (take either training or inference or both) in Θ-**notation**.

Part 2: upper bound estimation for PageRank

- Read the iconic paper "[The anatomy of a large-scale hypertextual Web search engine](#)" by Sergey Brin and Lawrence Page.

- Calculate the complexity upper bound for the algorithm using the same steps as in Part 1.

- For any unknown parts of implementation use your best judgment to decide on the potential implementation and use that in your evaluation.

- Estimate the worst-case time required to parse the modern Internet using today's hardware. Make appropriate assumptions. The estimation doesn't need to be precise, use high-level parameters like TOPS. List all assumptions in your submission.

Notes on submission

- Deadline: 11:59 pm Oct 4th

- Form: a single PDF per part and/or a link to a GitHub repo. Inline comments for complexity analysis.

- Where to send: petr.kurapov@gmail.com with email topic in the form:
    - <surname> computational complexity 2024 assignment 1