

Comparing the efficiency of Elo and Hot rank algorithms on pairwise recipes



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Motivation and Background

- The purpose of this experiment is to test the efficiency of the Elo and Hot Rank algorithms on pairwise recipes.
- An algorithm is a set of guidelines that describe how to perform a task.
- The Elo algorithm is a rating system designed for chess players. It compares the ranks of two players in order to determine which player would win the match.
- The Hot Rank algorithm was designed for the site, Reddit. The algorithm takes the number of up votes, down votes, and the submission time of the post in order to determine how popular it is. The posts popularity determines where it is ranked.

Methods

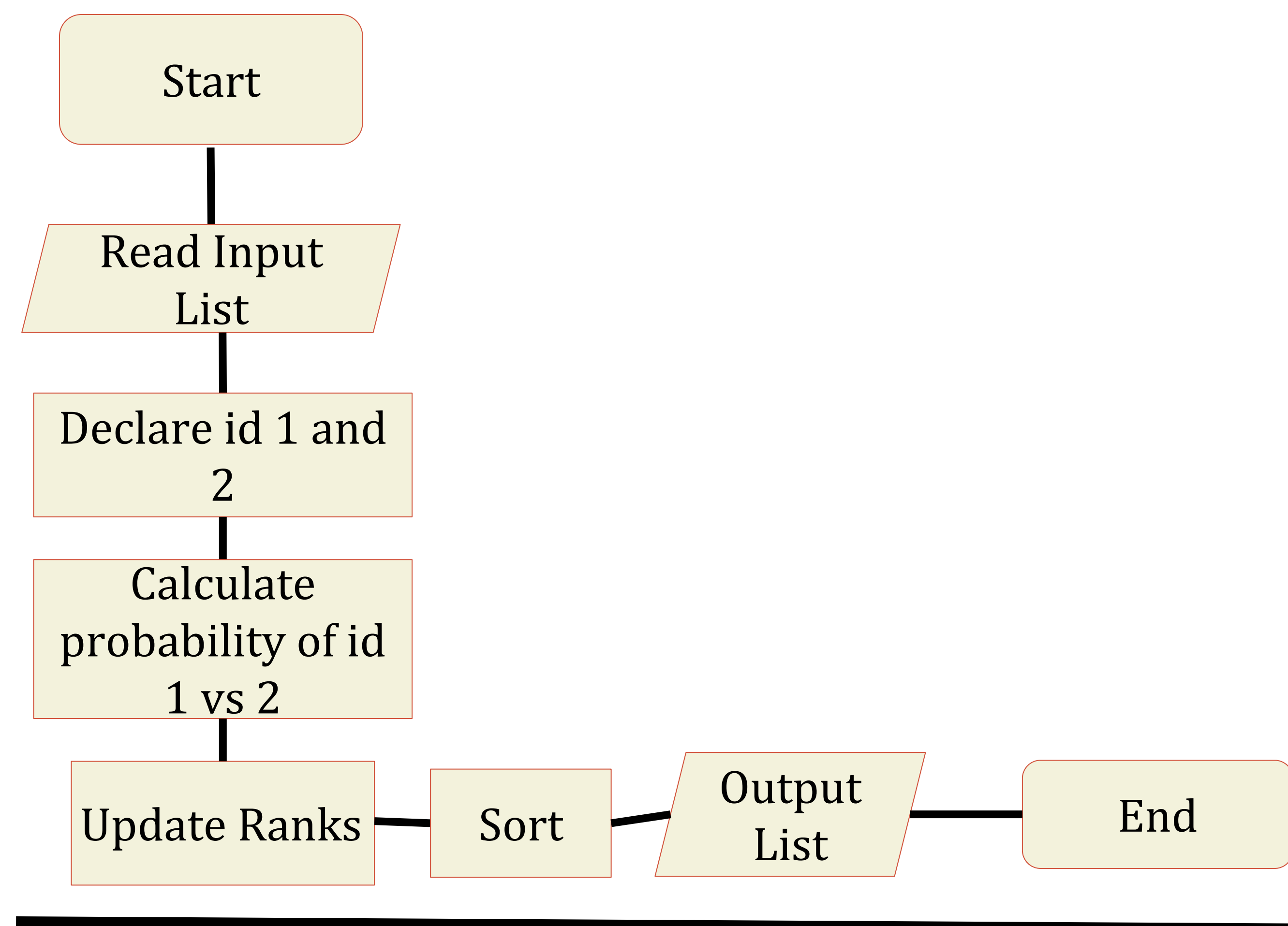
Database

- The algorithms get their list from a PostgreSQL database.
- The list contains four columns: an id, cuisine, ingredients, and a ranking.
- The list contains a thousand inputs.
- These inputs are queried as a list for the algorithms to sort.

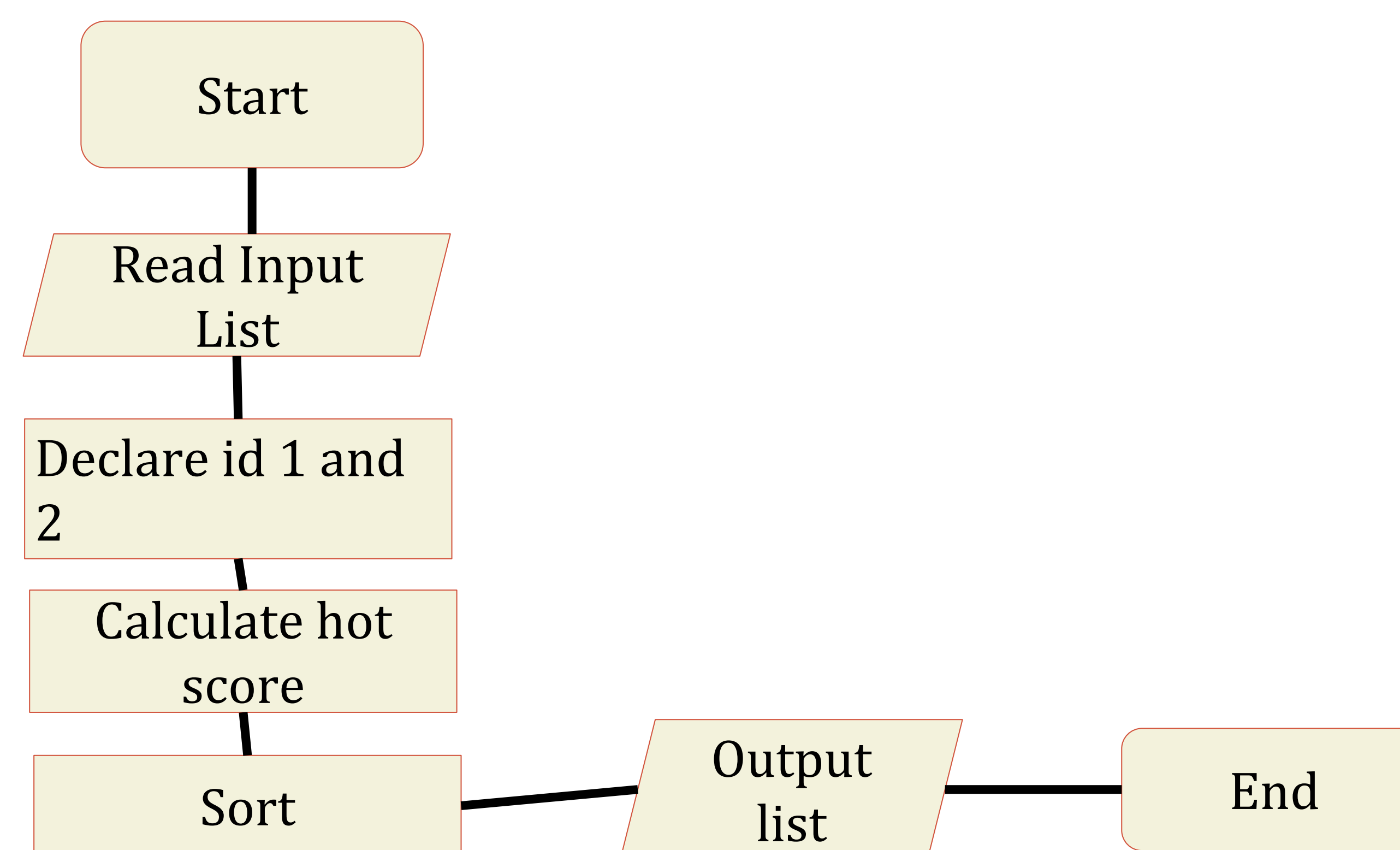
Implementation of the Elo and Hot Rank algorithms

- For the purpose of this research different elements from the algorithm was taken in order to sort the recipe id's.
- Both algorithms are implemented differently in order to simulate how they may function in reality.
- The original Elo algorithm is not a sorting algorithm. The original Hot Rank algorithm is a ranking algorithm. The two were modified accordingly.

Elo algorithm



Hot Rank algorithm



References

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- [3] R Compton. Elo outside of the competitive gaming realm.
- [4] Jin Huang and Charles X. Ling. Rank measures for ordering.
- [5] HugoDarwood. Epicurious - recipes with rating and nutrition.
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- [7] Amir Salihfendic. How reddit ranking algorithms work

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Preliminary Findings

Big O Notation

- Used to describe the time complexity of the algorithm. It usually provides the upper bound growth rate of the algorithm.
- For the Elo algorithm its big O notation was measured to be $O(n^2)$
- The Hot Rank algorithms big O notation was measured to be $O(n^2 \log n)$

Physical Results

Below the chart details the Elo algorithm and the Hot Rank algorithms times in sorting 50, 100, 150, and 200 items within a list.

Items	Time
50	58.9039990901947
100	118.53541421890259
150	179.89310431480408
200	239.27807903289795

Hot Rank algorithm

Items	Time
50	0.00037479400634765625
100	0.0007257461547851562
150	0.0012917518615722656
200	0.002343416213989258

Elo algorithm

Next Steps

For future work a recipe application would be built. This recipe app would display recipes for users to quickly swipe through to decide if they wanted to use it as well as rate the recipes depending on whether or not they enjoyed the recipe. The recipe app would be built using the data collected within this experiment.