HACKATHON 2024

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- **Problem Statement:** ID – PB_177
- **Problem Statement Title:** GROUPING ANAGRAMS
- **Theme:** ANAGRAM SORTING
- **PS Category:** SOFTWARE
- **Team ID:** 177
- **Team Name:** TECH TITANS

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Anagram Grouping Algorithm

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❖Sorting Anagrams Using Lists And Arrays

DETAILED EXPLANATION OF THE PROPOSED SOLUTION:

- Search for words that can be formed by rearranging the letters of other words.
- Identify these groups and place them in separate lists.
- now the group of anagrams are sorted alphabetically.
- Time complexity for sorting each word:O(n*k logk)
- Time complexity for grouping:O(n^2*k)

HOW IT ADDRESSES THE PROBLEM:

- Words with the same sorted letters are grouped as anagrams and again sorted in an alphabetical manner

INNOVATION AND UNIQUENESS OF THE SOLUTION:

1. Simplicity over complexity
2. Space efficiency
3. Optimal use of sorting

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TECHNICAL APPROACH

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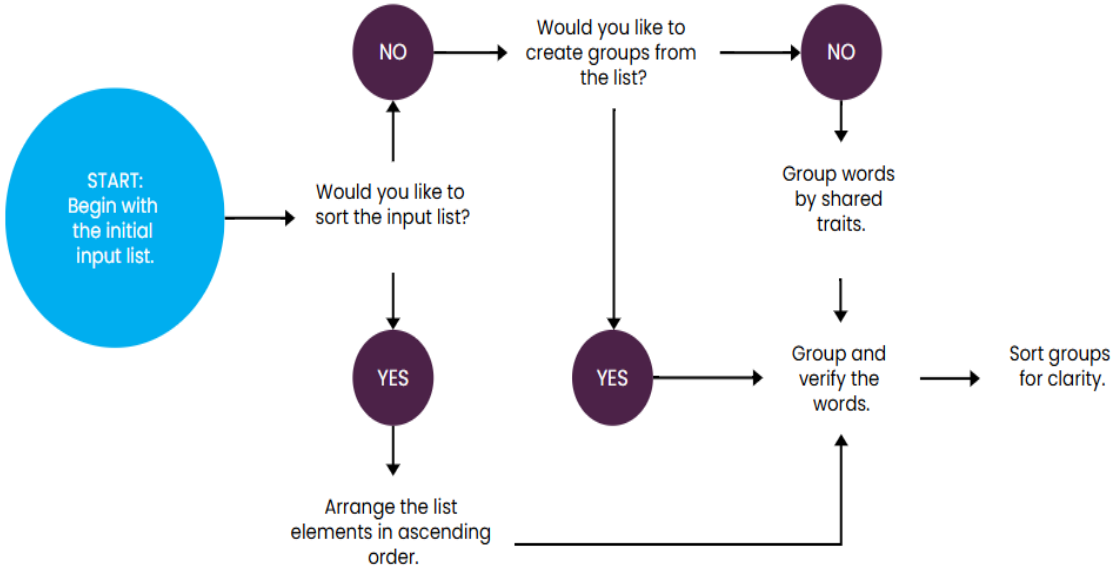
Technologies to be used (e.g. programming languages, frameworks, hardware):

1. Programming Language: JAVA
2. Frameworks like ArrayList and Collection. sort() are used.
3. Hardware: Laptop

- **Methodology and process for implementation (Flow Charts/Images/ working prototype)**



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FEASIBILITY AND VIABILITY

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Analysis of the feasibility of the idea:

- Space feasibility
- Simplicity and ease of implementation
- Extensibility
- Code Maintainability

Potential challenges and risks:

- Performance with large datasets
- Sorting overhead
- Edge case handling

Strategies for overcoming these challenges:

- Use multi-threading or parallel streams
- Optimizing the sorting algorithm
- Pre-processing of data

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IMPACT AND BENEFITS

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Potential impact on the target audience:

- Language learning and vocabulary building
- Word-based games
- Text processing and data analysis(NLP)

Benefits of the solution (social, economic, environmental, etc.):

- **SOCIAL:** Cognitive development
- Boost innovation in text-based applications
- **ENVIRONMENTAL:** Energy efficiency large-scale applications
- **ECONOMIC:** improve efficiency in text processing

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RESEARCH AND REFERENCES

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- **Details / Links of the reference and research work:**

- **Sorting algorithms and their efficiency-GeeksforGeeks**
https://www.geeksforgeeks.org/sorting-algorithms/

- **Group anagram by sorting-StackOverflow**
https://stackoverflow.com/questions/58150969/how-do-i-group-different-anagrams-together-from-a-given-string-array

- **String manipulation in java-oracle Documentation**
https://docs.oracle.com/javase/8/docs/api/java/lang/String.html